PROCEEDINGS

OF

SIGWAIS-II

JULY 23, 1993

LIBRARY OF CONGRESS

WASHINGTON, D.C.

April 14, 1994

Mr. Brewster Kahle
President
WAIS, Inc.
1040 Noel Drive
Menlo Park, CA 94025

Dear Mr. Kahle:

We at the Library of Congress would like to express our gratitude for your important contribution to SIGWAIS-II. Your presentation was both interesting and useful and we look forward to hearing about future developments.

Enclosed is a copy of the "Proceedings of SIGWAIS-II" containing the text of your talk.

Sincerely,

Herbert S. Becker
Director
Information Technology Services

Enclosure:

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EXECUTIVE SUMMARY

On July 23, the Library of Congress hosted the second SIGWAIS (Special Interest Group on Wide Area Information Servers). Sponsored jointly by the U.S. Geological Survey and the Clearinghouse for Networked Information Discovery and Retrieval (CNIDR) as well as by the Library of Congress, the theme of this meeting was "Libraries and Internet Databases: Quality and Navigation." Approximately 250 attendees from the federal government, academic institutions, and the private sector convened to share information about their work in developing and making use of WAIS and related network tools.

The morning session focused on the policy and communications environments that are supporting the dissemination of public information using the Internet, and on the emerging social aspects of the national and (international) networked communication and information infrastructure.

The afternoon session offered eight brief technical discussions highlighting a variety of WAIS implementations in the public and private sectors. Included in these sessions was a panel discussion answering "frequently asked questions" about the Z39.50 standard protocol.

Demonstrations of a variety of WAIS (and related) tools were offered in the Library's National Demonstration Lab. ITS joined demonstrations by NASA, USGS, Picture Elements, and Wais, Inc., and other organizations with its demonstration of the Library's newly created OS/2 WAIS client.

Library staff instrumental in making the conference possible were a planning team that included Mary Bernheisel (ITS), Audrey Fischer (ITS), Chuck Gialloreto (ITS), Dan Gold (CDS), Anna Keller (CPO), Bob Morgan (ITS), Virginia Sorkin (ITS), and Joe Wright (ITS). Other Library staff whose support was critical included Jane Bortnick Griffith and ITS Director Herbert Becker, as well as Tom Littlejohn (ITS), Ray Denenberg (Network Development Office), John Ragsdale (CRS), and Jacqueline Hess and Ellyn Blanton of the National Demonstration Lab.

SIGWAIS-II documents, including many speakers' presentations, are being made available on the Library's Campus Wide Information System, LC MARVEL. To access them, point your gopher to: marvel.loc.gov and login as marvel; or telnet to marvel.loc.gov 70 and login as marvel.

TABLE OF CONTENTS

REMARKS TO SIGWAIS MEETING

Jane Bortnick Griffith, Library of Congress
Acting Associate Librarian for Science and Technology Information

It is my pleasure to welcome all of you here today to the Library of Congress to participate in the second SIGWAIS meeting. The Library is pleased to be part of the growing Internet community and is committed to continuing our involvement in Internet activities. It is appropriate to have this meeting here because the Library of Congress is an institution with strong ties to librarians, technology developers, and policymakers--all key players in the evolution of an advanced information infrastructure. We believe that dissemination of information over the Internet will enable us to reach far beyond the existing LC user community to a vastly expanded array of users throughout the United States and internationally. At the same time we recognize that the Internet offers us new opportunities for acquiring information more efficiently, collaborating with other information providers, and improving the effectiveness of our internal operations.

Let me just mention a few milestones here at the Library to illustrate our increasing involvement in use of the Internet. In August 1990, the Library established its initial connection to the Internet at 56K. In January 1992 that connection was upgraded to T-1 speed (1.54M). In March of last year selected documents from the "Revelations from the Russian Archives " exhibit were scanned and the images made available as the Library's first anonymous FTP directory. Selections from all succeeding major LC exhibits also have been made available via FTP. These include "1492: An Ongoing Voyage"; "Rome Reborn:The Vatican Library and Renaissance Culture"; and "Scrolls from the Dead Sea." The number of people who have been able to view these exhibits online greatly surpasses those able to actually visit the exhibits. The Russian material came from the Communist Party archives that had never before been seen. And even today, the Russian Government does not make those archival materials available to the public. Therefore downloading them from the Internet is the only way Russians can have access to them.

Over a year ago an Internet User's group was formed here at LC. That user's group has operated much in the spirit of Internet users everywhere--it is essentially a grassroots organization comprised of staff willing to devote time to enhancing their own and the Library's use of Internet. That group continues to be a driving force in LC's Internet activities and deserves much credit for the fine work they have done. In March of this year, LC established its first Listserv "The Library of Congress Cataloging Newsline" and in April the Library of Congress Information System (LOCIS) containing card catalog and legislative information became available. Just this month we unveiled out Gopher-software Campus-Wide Information System, which we call MARVEL, to the Internet community. The response has been overwhelmingly positive.

The Library also has a number of efforts underway for expanding our use of Internet. A WAIS OS2 client is expected to be completed this summer. Demos of it can

be seen today in the Atrium. An evaluation of the WAIS commercial server began this month, It is being used to search the MARVEL databases containing the Library's regulations, a microforms records database, and "Publications in Print." Selections from the Library's American Memory project containing collections of original Americana materials are being made available as WAIS databases. These include Civil War photographs, broadsides from the collection "Documents of the Continental Congress and Constitutional Convention, ca. 1774-1790"; and documents from the state of Indiana collection "Life Histories from Folklore Project, Works Progress Administration, Federal Writer's Project, 1936- 1939." The Library also is evaluating use of the WAIS server for a number of other textual materials.

Another Internet pilot project underway is the Law Library's International Legal Information Network which is transferring images of foreign statutes from Mexico and Brazil. An abstract is then created from these images and made available on the Library's SCORPIO online retrieval system. In addition, the Library is participating in an Advanced Research Projects Agency (ARPA) project being carried out by the Corporation for National Research Initiatives (CNRI) to prototype an electronic copyright management system that will initially store and disseminate technical reports in computer science generated by five universities. The project includes handling electronic submission of documents (including digital signatures for verification), storage in an online depository, the digital transfer of rights and permissions, electronic payment, and user interfaces. As you can see from this listing of projects, the Library is very much involved in a variety of efforts to expand access to information electronically. We recognize that this is just a beginning. Many of you in this room are the pioneers in expanding use of the Internet. We look forward to benefitting from continuing interaction with others in the Internet community and sharing ideas of mutual interest.

This is a very exciting time for those of us in the "information" field. The rate of progress for developing new tools for accessing information electronically is astounding. The amount of information being made available on the networks is so enormous that it creates real challenges for us. The number of users continues to expand at an exponential rate. And information issues are receiving attention in Congress, the Administration, and even the press as never before. As a policy analyst in this field for many years, I used to wonder whether these issues would ever attract much attention. Today, articles on the information superhighway appear in the daily papers and in popular magazines.

Congress is considering a number of bills related to promoting electronic access to information. These include bills to promote development of an information infrastructure; bills to enhance access to government information; bills promoting applications for schools, libraries, and health services; and bills focusing on privacy and intellectual property rights. It would take too long to go through all of these this morning, but I believe we have made a listing of them available to you. What seems clear, however, is that a number of these bills are receiving priority attention and that

they will contribute to the policy framework necessary for advancing a national information infrastructure. For example, P.L. 103-40, the Government Printing Office Electronic Information Access Enhancement Act of 1993 promotes electronic public access to government information, including the Congressional Record and the Federal Register. H.R. 1757, the High Performance Computing and High Speed Networking Applications Act of 1993 contains a section on applications for government information that authorizes projects for "connecting depository libraries and other sources of government information to the Internet."

These are just two of several bills related to information infrastructure issues. Just last week the Library hosted a one day conference entitled "Delivering Electronic Information in a Knowledge-Based Democracy" which brought together about 40 participants from industry, government, and the library community to discuss the policy framework essential to creating an advanced information infrastructure. The three main themes of the conference were: Building, locating, and preserving the electronic store of knowledge; public and private sector roles; and mechanism for safeguarding intellectual property rights. Vice President Al Gore, who served as Honorary Chair stated at the meeting that the construction of the information superhighway will facilitate a new distillation process, where raw data is pressed into information, the information is distilled into knowledge, and then knowledge is fermented into wisdom. The people in this room are certainly important players in that distillation process.

The Administration likewise is devoting considerable attention to building a national information infrastructure (NII). The White House has recently formed, under the aegis of the National Economic Council and the Office of Science and Technology Policy, the Information Infrastructure Task Force (IITF) which will be chaired by the Secretary of Commerce. Much of the work of the task force will be done through three committees: Telecommunications Policy, Information Policy, and Applications. In addition a private sector advisory group will be established. Through this task force, a variety of issues relating to promoting a national information infrastructure will be addressed and strategies developed.

I have provided an overview of how we here at the Library are working toward enhancing our use of the Internet, as well as how Congress and the Administration are addressing related public policy issues. It is my pleasure now to introduce this morning's other speakers who will present perspectives from their organizations on libraries and Internet. I also would like to express our great appreciation to Virginia Sorkin and Anna Keller for all their work in putting today's meeting together.

REMARKS ON NEW ADMINISTRATIVE INITIATIVES IN INFORMATION POLICY

Peter Weiss
Office of Information and Regulatory Affairs
Office of Management and Budget

I would like to reiterate a few things that Jane said. This administration, particularly my boss, Sally Katzen, the new Administrator of the Office of Information and Regulatory Affairs, the Director of OMB, Mr. Leon Panetta, and Vice-President Gore, have all said to us, on their staffs, and have said publicly on a number of occasions, that they are fully committed to the development of governmental policy that will aid us in the transition to an electronic environment both in the way we do our day-to-day business and in the way we make government information available to the public.

There are a couple of parameters to this. Jane mentioned one of them; that is the Information Infrastructure Task Force being jointly managed and set up under the auspices of the National Economic Council and the Office of Science and Technology Policy with heavy involvement from the Secretary of Commerce, from my boss Sally Katzen, and from a number of agencies.

We hope that process will address some of the issues that have been stalled or have not been given adequate attention over the last few years. To give you one example: the group has decided to look at issues associated with the Freedom of Information Act in the electronic environment. I do want to reiterate what Jane said about there being a mechanism set up which will permit public input into that process so that you folks will have an opportunity to share your views with that process. It will not be a closed government figuring out what-is-best-for-you type of process. I can't stress that more. We are committed to that.

What I'd like to do now for a couple of minutes is highlight a few topics that are contained in another facet of the administration's approach to the emerging technologies. And that is OMB's Circular A-130, the first comprehensive revision of which was published in the Federal Register on July 2. There are a limited number of copies available today. They can also be downloaded through anonymous FTP from the Internet. This is one of the first times that a semi-formal government document has been made broadly available on the Internet. Let me just quickly give you the instructions. On anon FTP from nis.nsf.net; the file is entitled ombomb.a130.rev2.

This document is an umbrella of federal information management policy and it is directed to the heads of the various federal agencies. As such, it deals with a number of topics: the collection of information; records management; information management; and

information dissemination. One of the thrusts of the document, however, is a strong emphasis on electronic information dissemination. Let me just read to you one piece from the explanatory materials in the document where we talk about the benefits that can be derived from electronic information dissemination and then go on to say that, "the development of public electronic information networks such as the Internet provides an additional way for agencies to increase the diversity of information sources available to the public. Emerging standards such as Wide Area Information Servers using NISO Z39.50 will be used increasingly to facilitate dissemination of government information such as environmental data, international trade information, and economic statistics in a networked environment."

The preceding is a statement of vision. And what we attempt to do in the body of the policy document, among many other things in this broad-ranging document, is to state a basic policy on electronic information dissemination. Let me just read it to you:

"Agencies shall use electronic media and formats including public networks as appropriate and within budgetary constraints in order to make government information more easily accessible and useful to the public. The use of electronic media and formats for information dissemination is appropriate under the following conditions:" [And I would note that these conditions are not exclusive, they are illustrative.]

"A) The agency develops and maintains the information electronically. B) Electronic media and formats are practical and cost-effective ways to provide access to a large highly detailed volume of information. C) The agency disseminates the product frequently. D) The agency knows a substantial portion of users have ready access to the necessary information technology and training to use electronic information dissemination of products and a change to electronic dissemination as the sole means of disseminating the product will not impose substantial acquisition or training costs on users, especially state and local governments and small business entities."

Those two last points with regard to making sure that the audience is capable of receiving the information electronically, and lastly making sure that people are not disadvantaged who do not have access yet to the technologies and the training, we feel is important, particularly since, as you all know, we are in a transitional period and not everyone yet is as wired as you are.

So that, briefly, is what we've done on electronic information dissemination in A-130. There is also a strong emphasis on the use of electronic techniques, for example, electronic data interchange for the collection of information from the public. There are a number of pilot projects going in the government in the area of public purchasing, procurement, and in the area of regulatory matters. For example the Securities and Exchange Commission is ramping up its electronic data gathering and retrieval system. In a couple of years all publicly traded companies will no longer be filing paper reports. The Environmental Protection Agency is experimenting with a couple of initiatives to

automate some of the environmental filings. You can imagine that the opportunities go on and on. We feel very strongly that electronic information collection and electronic information dissemination are two sides of the same coin and that the use of these techniques has a strong likelihood, if used properly, to speed up, and make more efficient the day-to-day workings of the government and, hopefully, in the process save the taxpayers money. So we are committed to this.

In a separate initiative, my boss, Sally Katzen, is developing guidance to the agencies which will explicitly encourage them to consider electronic techniques in their information collection activities and we will be using our authority under the Paperwork Reduction Act to try to see that that occurs more frequently than it does today.

INTERNET INFORMATION ACCESS AND DELIVERY:
KEY CONCEPTS, TOOLS, STRATEGIES, AND ISSUES

Paul Evan Peters
Executive Director
Coalition for Networked Information
Washington, DC

Introduction

Craig [Summerhill] and I want to share some of what the Coalition has learned and is doing in this very important area, which is central to the mission of the Coalition.

I will focus on the current state of the Internet information environment, and will suggest a few strategies by which you can make progress in this area.

Craig will focus on the standards and standards development efforts that are most relevant to this area, and will suggest a few ways by which you can get involved with those standards and in those efforts.

We hope to provide a framework for today's proceedings and perhaps even for some thinking and work you will be doing after today.

Our basic message to you today is:

* Content, quality, and navigation are the value generating opportunities and challenges of the contemporary Internet. Being concerned about these things is definitely one of the right things about which to be concerned.

* Information resource managers (by which I mean librarians, information technologists, user support specialists, publishers, etc.) will play the key role in framing and addressing Internet content, quality, and navigation opportunities and challenges.

* Early and continuing concern about "interoperability" and participation in standardization efforts that promote interoperability of platforms, systems, and services are extremely important factors for making sustainable progress in this area.

Session aerobics

Reality check! How many of you have:
    Heard of the Internet.
    Use the Internet.
    Use the Internet for something other than electronic mail.
    Do any of you think the Internet was invented by the commercial fishing industry?!

Professional identification. How many of you think of yourself as:

        Librarian.
        Technologists.
        Managers.
        UNIX gearheads?!
        "Jurassic Park": "It's UNIX; I can handle this; Cool."

Our basic perspective

We represent a coalition of three large, primarily North American, associations that address various aspects of knowledge management and information technology in primarily higher education settings: ARL, CAUSE, and EDUCOM.

We manage a task force of 190+ institutions and organizations that provide this coalition with many of the insights, initiatives, and resources it needs to pursue its mission of promoting the creation and use of networked information resources and services to promote scholarship and intellectual productivity. One third of the members of the task force are technology, information, and other providers, and many of these are for-profit entities.

The members of the Coalition and its task force have made major, perhaps the major investments of time, talent, and money in the Internet, and they are eager to increase the returns on their investments by promoting the use of the Internet for communication and publication as well as for computation.

The Coalition is also a small business (three folks and around $700K per year) that offers a variety of networked information resources and services to the Internet community. We are ".org" and proud of it.

The current Internet Information Environment

I regard the Internet to be the "networked information universe" that was formed by the big bang in cyberspace that occurred in 1986, when the NSFNet began production operation.

Three basic conditions produced the big bang:

* NSF supports basic rather than mission oriented research and education.

* NSF connects institutions rather than specific principal investigators.

* NSF acts as a "transit" network, particularly for international traffic.

A critical mass of performance and users has formed in the Internet, and this critical mass is generating networked information resources and services in a spontaneous and mutually reinforcing manner.

A large portion of the opportunities and challenges presented by the contemporary Internet information environment can be described as embracing the realities that it presents.

Said otherwise, a paleo-electronic environment has formed in the Internet. It is an environment:

* In which crude tools are being used to fashion crude by functional artifacts;

* In which the dominant personalities are hunters, gatherers, and story-tellers; and

* In which institutions and organizations, including libraries and information centers and providers of all types, are hard at work securing the gains of these pioneers by constructing fixed settlements that are attractive to settlers who are much more interested in husbanding domesticated flora and fauna than they are in exploring what's over the next technological horizon.

- "Flora" = databases. They grow, requiring weeding and pruning, and do not move from one place to another on their own accord.

- "Fauna" = algorithms. They spawn, infect, and have minds of their own.

Yes, my perspective on the current state of the network info- structure represented by the Internet has been influenced by my love of science fiction: John Brunner's "The Shockwave Rider," David Brin's "Earth," Vernor Vinge's "A Fire Upon the Deep," Milton Wolf and R. Bruce Miller's "Intelligent Robots, An Aware Internet, and Cyberpunk Librarians."

But this is not an entirely whimsical interest of mine, because language is important and metaphors are invaluable wheels for the mind.

This is particularly interesting to me because one metaphor, that of the "information superhighway," has seized most if not all of the early engineering and public policy conceptual space. As is the case with all metaphors, this has had an effect, however tacitly, of including some people and things to the exclusion of other people and things. I have been pursuing other metaphors because of my concern about this process of conceptual and social inclusion and exclusion, particularly at these early stages in the engineering and population of cyberspace.

* Key features of the "information superhighway" metaphor are that: The Internet is being built to meet specified requirements; capitalists, engineers, and regulators are playing the key roles; Apollo is the god of the Internet.

* Key features of the "information universe" metaphor are that: The Internet is growing in response to aspiration and risk taking; pioneers, inventors, and evangelists are playing the key roles; Eros is the god of the Internet.

* Other metaphors for the Internet: a quilt; a flea market.

Strategies by Which to Make Progress

First, advocate a total Internet strategy to your management. This means getting the local info-structure in place; training and supporting end-users and staff; using the Internet for document access and delivery; and developing capabilities for Internet resource discovery and management.

Second, pay close attention to "creative" behaviors of network users. Breakthroughs will come from folks who are working on priorities unknown to the managers who keep them in computer cycles and network bandwidth. Breakthroughs will come from folks who suffer from the "got a hammer, then everything is a nail" syndrome. Breakthroughs will also come from folks who are too desperate or too dumb to behave according to the "received wisdom." And, of course, breakthroughs will come from professional information resource managers like us.

Third, advocate interoperable platforms, systems, and services. "It's a network, stupid!" "All the world's a network, and all the nodes are clients and servers." Think in terms of each client accessing multiple servers simultaneously.

Fourth, be open to fundamental shifts in thinking: From acquiring information to constructing tailored information system images; from cataloging to registration; from question-answering to current awareness; from users looking for information to information looking for users; from users looking for information to authors looking for audiences.

Finally, practice, practice, practice. Give in to relatively more technology push, than demand pull. And, when all is said and done, make sure that you do more than you say!

CNI'S WORK AND HOW TO GET INVOLVED

Craig Summerhill
Systems Coordinator and Program Officer
Coalition for Networked Information

CNI is host to several listservs related to CNI (listserv@cni.org). CNI FTP archives can be found at ftp.cni.org. CNI's Gopher is available at gopher.cni.org using the standard port 70. There are also a variety of databases recently created which serve a need for institutional list history. To access these, telnet to a.cni.org and login as brsuser using basic vt100 emulation.

I don't need to give this audience a full history of the Internet, but as a precursor to the comments I want to make, it's interesting to note that the Internet developed in the late 60's as a project of the Advanced Research Projects Agency using a protocol suite called TCP/IP. Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP), and telnet, the original three applications developed, until a couple of years ago, accounted for the majority of Internet traffic. Somebody recently challenged my statement that SMTP still accounts for the vast majority of traffic, contending instead that Gopher had recently overtaken SMTP. I have not been able to find data to validate that but think that it is possible.

In the last couple of years, more advanced tools have been developed. The tools are discussed in alphabetical order with the exception of Veronica, which I consider a subset of Gopher.

* Archie was developed at McGill University. Archie is an automated system for accessing and building databases of anonymous FTP archive sites across the Internet.

* Gopher was developed to provide a menuing system for viewing Internet information servers hierarchically. The librarians in the audience can draw the metaphor between browsing the book stacks and browsing through menus in Gopher space. Veronica added an Archie-like capability to Gopher by allowing the user to do some basic keyword searching and later some very basic Boolean operand searching across the items which live in Gopher space, thereby providing some extensibility to Gopher for retrieving Internet information.

* NCSA Mosaic is a single user interface which provides access to a wide variety of Internet tools. There are buttons or click-and-drag menus that allow a user to execute WAIS searches, access Gopher items, use FTP and finger, all of these protocols from a single application which does not require 32M of memory to run.

* There is the Wide Area Information Server which you all know something about or you would not be here. The WAIS system uses the NISO Z39.50 protocol.

* And finally there is the Worldwide Web which was developed at CERN.

These are all more advanced client-server applications. One of the things which we are beginning to see with these systems is that they perform certain functions well and don't perform other functions as well.

What is on the horizon? Multi-purpose Internet Mail Exchange (MIME) which will allow multimedia to be passed in mail on the Internet. It will be a long time before this is available at every home or to the world, but certainly within the research and development communities and within most of the organizations which you are affiliated with, there are workstations which have the capability to support this type of protocol. We already have the ability to pass graphics and video within electronic mail transmissions, and we have databases which can serve up images in a networked environment.

One of the two things on the horizon which I want to focus on is the development of uniform methodologies for resource location and identification. The Internet Engineering Task Force (IETF) has working groups, under the broad umbrella of Integrated Information Architectures, which are very important to the development of this methodology. We are going to see far more peer-to-peer communications, computers talking to computers, not people necessarily talking to computers. We are going to see clients which incorporate user profiles and filtering of information. We are very soon going to be swimming in an information sea. Those of you who hold focal positions within your organization, such as postmaster, know how overwhelmed you are with mail. We need to have better tools for filtering information. We are going to see telemetry and sensor feeds. We already have a satellite or satellites in orbit which transmit North American weather information to the 'Net where a computer automatically receives the data and loads the files in various formats into an FTP archive where the files become accessible. There are two Internet workstations in Antarctica. In the future, you are going to see weather stations online which continuously broadcast weather information on a specific frequency so that all a user has to do is focus a client on that frequency to receive that data. We will see data that does not require human intervention for creation. In the future we will see more multi-faceted clients such as Mosaic.

Issues which I consider important are the following. The registration model becomes more prevalent in this environment. The maintenance agency for protocols and for systems become increasingly important. The Library of Congress is the maintenance agency for the NISO Z39.50 protocol in the United States. The maintenance agencies become increasingly important as we begin to develop interoperable systems, systems which we can rely on for a long term period. There will be competing commercial and

non- commercial interests which come up. One of my concerns is that there is a big difference, known to the library community, between known-item searching and topic-oriented queries. Known-item searching is very easy to do given some of the tools available. That's great if the user knows something exists. But more and more information is going to seek an audience, authors are going to look for someone to distribute their goods to. People have to have tools for doing known-item queries in a large meta-space at different layers of the information universe. Quality versus quantity is a big issue.

Granularity in directory service development is very important. This is a critical issue. One of the problems we have with projects such as the Coalition's TopNode project and other similar directory services projects is that the people who are building the directories don't have a very good vision of what they are trying to build. There is so little information in the network universe compared to the analog universe of print which libraries deal with now. It is an infinitesimal amount of information with a lot of duplication. People who have been building directory services have not had a good vision of what their directory is supposed to do or what level of granularity the directory needs to serve. There are a wide variety of directories. Look at AT&T or Bellcore type white pages--very simple structure: sometimes an address and telephone number; sometimes a name, address and telephone number. There are much more detailed directory types of information which can be built. Knowing the cut--whether looking at meta- or micro-data within a specific database--when building the tools, is becoming increasingly important as the network's information space grows.

Supporting remote users is going to be increasingly difficult. Similarly, how to determine what kind of meaningful data they are getting out of their system in a wide-area environment will continue to pose a problem. When someone gets on a video link from New York City to L.A. and is searching one of your databases and doesn't understand, you will have to determine what kind of client is being used, what version of the software is being used. These variables will cause some interesting demands in terms of technician and librarian user support of our systems.

I am now going to spend my final two minutes on the two items which Paul asked me to cover. They are: Z39.50 as an open standard and the development of that standard in a large user community specifically based in the TCP/IP environment; and the Information Engineering Task Force (IETF) and some of the work which is being done by it.

I am going to defer some portion of the Z39.50 discussion in anticipation of the Z39.50 panel to be chaired by Ray Denenberg this afternoon. There are two Z39.50 groups which I think you should be aware of: the Z39.50 Implementors Group (ZIG) which is focused on the continued development of the standard and on the development of inter-operable systems using the standard. The initial WAIS system which Brewster designed and put into the public domain was based on the 1988 revision of the Z39.50

protocol. I think Brewster would agree with me that most systems people would have assessed that protocol as being highly unusable for developing a well-refined system. So WAIS incorporated certain extensions beyond the bounds of the protocol to make the system work. In 1992 version 2 of the standard was officially voted on and adopted and published by NISO. There is a current draft 3 which Ray will talk more about since the draft version lives on his personal computer. It incorporates some important features that are being developed by ZIG members into their systems. ZIG developers include both not- for-profit and commercial ventures, such as AT&T, OCLC, and libraries such as Penn State, and the University of California, working to develop interoperable systems.

Z39.50 has been criticized as being very complex and difficult to implement and I am not going to defend it as I think that there is some validity in the criticism. But there are people in this room who I think can tell you what the implications of developing the system are, going outside of this community. Certainly if you are within a library agency it is very important to pay attention to what is happening with the ZIG because the library system vendors and the library community in the larger TCP/IP Internet are developing systems now which work within the standard.

The other group related to this is a group that the Coalition started called the Z39.50 Interoperability Testbed (ZIT) which was a spinoff of the ZIG. Clifford Lynch, who is the Director of Library Automation for the University of California, chaired this group. He is interested in winding this group down this year, feeling that it has done much of what it was set up to do. It has tested some of the interoperability between client and server developers. It has also added some forward momentum to the development of the ZIG group in developing the standard.

I am more closely associated with the work of the IETF. The diagram I am going to use is courtesy of Chris Weider of Merit. One of the things which has come out of the Archie, Gopher, and other systems experience, is the need for a uniform method of resource location and resource identification in the network. The Archie experience specifically allowed the system to go out and use a protocol called XTP, tap into archives, and build databases of the directories of the files. Some things were discovered early: people move files from one system to another; sometimes files are renamed in the process so that the names are more descriptive (in systems which allow more descriptive names). If an FTP archive running on VMS or an IBM mainframe is moved to a UNIX system it makes sense to change the name and make it more descriptive because UNIX is not limited to eight-character file names and file types like VM/CMS is. If a file is taken from a UNIX system and put on a VM/CMS system, the file must be renamed to match the IBM file naming conventions. There also is no way of differentiating between files which contain the same intellectual content but differ in data format. This problem exists not only for Archie, but for other network tools including Gopher and WAIS.

14

The IETF developed an integrated information architecture program to start solving some of the problems associated with tracking objects in the network. Resources live in the network. Above the resource is a transponder or system which uses a protocol that knows the resource location and the uniform resource number (URN) or uniform resource identifier of this object. For librarians and publishers, the identifiers are similar to ISBNs or ISSNs. The transponder takes the data from the servers and puts it into a database similar to the database built by Archie. The database consists of URN to URL (uniform resource locator) mappings. There is one single URN; there can be multiple locations where that object resides in the network. At the top level there are the TCP/IP protocol suite and the application protocols such as Gopher, WAIS, WWW.

In this example, Gopher has a URL. It knows the location of an object so the Gopher system can bypass the resource location service or the RLS and go directly to the URL directory or to the domain name service and then contact the server which has the object. In the example, WAIS and WWW do not have the locator, they only have the number of the item. The WAIS system or the Worldwide Web system will contact a resource location service similar to the domain name service. The Resource Location Service can be run locally, it can be run by a third party, it can be run by a mid- level service provider. The application contacts the RLS or the resolver which then goes out and contacts the URL/URN database, does a look-up on the URN of the desired object, finds the URL or multiple URLs, sends the data back to the resolver which communicates it to the application. The application can then go and retrieve the object directly from a server or multiple servers in the network. The chief advantage of this system is that it is highly automated. If an object is moved, the transponder will send data to the central directory servers so that it doesn't matter if objects move or are renamed. The URL will be changed as needed; URNs never change. This entire model is approximately 50 percent complete. There are four IETF working groups working on parts of the model. The URL model is close to completion; the URN model is still under development.

WAIS IN THE FUTURE

Brewster Kahle, President
WAIS, Inc.

It's a real thrill, to be at the Library of Congress, doing something that most of the people in the Internet think of as sort of underground, and mischievous. The Internet is sort of - - they're so proud of themselves and ourselves, of being sort of the underground, and the Library of Congress is NOT part of the underground, alright? The Library of Congress for most people connotes a sense of quality, a sense of endurance, permanence. If you actually get your book accepted by that random gatekeeper at the Library of Congress, and put into the collection, it's going to last a really long time, and historians are going to be able to know about it.

So I think it's a great combination. What I thought I'd do is say a little bit about WAIS into the future. Sorry about inventing an acronym...I'll try to pun on it. But what I find interesting about this area, is that very few generations get to see a technology change in the way people communicate with each other. There's the book, there's the telephone, and now we're seeing the electronic dissemination of information: a technology change for how people communicate with each other. All sorts of really wild and wonderful things happen, when you have one of these things. Corporations come and go, city structures change, basically what it means to be a human being, changes, when we have a new mechanism for connecting people. And what's interesting about this revolution, is that it's an inclusive one. A lot of us, in this room, are taking part in forming it, and trying to figure out how it makes sense, what things are right, what things are wrong, and we're going through the prototyping of what this new generation will look like.

Well, really what we're talking about mostly in all this stuff is plumbing. And plumbing -- you know, how does it all connect up, does it really go through, gopher, Z39.50 version 1, version 2, it's all plumbing. And usually the only time you care about plumbing, is when it's backing up. What the users really want to know is, "what can I get to?" "What can I do now, that impinges on my job?" And that's what I hope to talk about, not so much what's out there now -- but a little bit about where we are now, why we're here, what's going right, why there are this many people at least interested in the area, and where are we going.

I thought I'd try to say a little bit about where are we. WAIS on the Internet. WAIS on the Internet is built on Z39.50, version 1, everybody's going to version 2+, but it's basically a standards-oriented system, that has gotten very widespread use. There's this feeling of pent-up demand. Everybody's got something to say. And lots of people want to be able to find lots of things that are out there. There are, on WAIS itself, as of six months ago, about 30,000 users, on the Internet, using these information resources.

17

The users were in about 33 countries, pretty much North America, Western Europe, and the Pacific Rim; Africa is a basket case, we've not been able to get network connections, so not a lot of users are coming from Africa yet. And we're moving down into South America.

The sorts of things that people are able to get at: One of the handouts is an ancient printed copy of what you can get at using WAIS. Astronomy images, not just text, but whole images of what happens if you look up; periodical references, biology journal contents -- there's a database in Finland, that's basically the table of contents from lots of different journals. There are 35 databases from the biology domain alone, that are being served on WAIS. The Communications of the ACM, which is a group that's put a pilot server up, of all of the full text of the communications of the ACM, it's now out of date, but it's showing publisher interest, even though it's still based on no money changing hands yet; speeches of Bill Clinton, and press releases, are served; the Simpsons, capsules of episodes from the Simpsons -- basically we're finding that it's not just the big boys that can go and control the printing presses in this world. Anybody with something to say can start putting it out. And be amazed at how many people go out and use those resources. Columbia Law Library catalogs, the U.S. Supreme Court decisions in full text, some documents from the Office of Technology Assessment. So it just goes on and on. There are 450 databases now, it's doubling about every six months.

What we're looking for now is to increase the quality. We've got basically past the technology showcase period, but now we're trying to figure out, how do we make this stuff real: how do we get commercial publishers involved, and how do we get quality collections, like the Library of Congress, up and easily accessible by lots of people.

Why are we here? What are the issues that have made this sort of thing go forward? A couple of aspects. Publishing is exploding. Just the amount of information people want to disseminate is just going through the roof. You know these exponential graphs: the number of journals, the number of conferences, and basically that is creating a pent-up demand for getting information out. The other is on the consuming side. People are expected to know more and more of what's out there. I don't know how many meetings I go into, nowadays, it used to be that you just read the "Wall Street Journal," the "New York Times," you could walk into a meeting, and you got your [self] covered. Nobody's going to come up with a random event from the day that you don't know at least something about. But now you get these, "I saw this on the Net," or "Did you see this thing in this obscure journal," and you're sort of expected to know more. Which now means we basically need all the mechanisms for finding the right information for us, without making us have that anxiety attack and shaking when we go home.

Another aspect is that global communication is becoming the mechanism for dealing with all information. And the characteristics of paper distribution just aren't making it. We use electronic to download it, and then paper to view it, until we actually have screens that are worth looking at, but the mechanism for distributing the information is going electronic.

There are other aspects about why we're here. Middle layer managers, who often are the mechanisms for information dispersal within large organizations, are being fired in droves. So we're getting a lot more peer to peer communication, where engineers and scientists are trying to find the right stuff, without all the infrastructure of people to move information around. There are cost pressures. Government agencies are being mandated to get their information out. So if they go out and answer every phone call, and have to go and send out some sheets of paper, they'll just go broke. So these are cheaper ways of distributing information.

And another aspect of why this is going so well in Washington, is that we've got a new President, that really loves this stuff. And boy, that just changes things around. I come from the .com world, the commercial world, and I don't actually see people paying as much attention to the president of Apple, within Apple, as I see people paying attention to the President of the United States. So when we have a President of the United States saying, "let's go more electronic, and get more of our information out," it actually does make quite a bit of a change all the way down through one of these organizations.

OK. Where are we going. What we'll see today, and I suggest, one of the most important things about today's meeting, is not so much my standing up here and blathering along. It's the demonstrations downstairs in the Atrium. Get an idea of what this stuff really looks like, what it really feels like, why people actually can go and use this stuff. This is the first time that I've done anything as an engineer, that my mom could use. Usually I get that kind of "proud of you, son, I don't know what you're doing, but I'm sure it's important." But she was actually able to go in and use recipes, lyrics, poems, all kinds of things that she was actually interested in. So this isn't the sort of frightening, MIS department, "gee it's going to be good for you, we promise," kind of thing. It's actually usable, it's often even fun. So please do it.

Where are we going? The important part is to increase the quality of the information that's available on the Net. There are two major areas that we're pushing on within WAIS Inc. Federal information sharing, and the commercial publishers. The federal sector is a great area, because they in general don't charge for access for things. So there's a mechanism, and there's a community, that's trying to get information out. So that can be the early adopters in putting like the Library of Congress card catalog out, or patents. To give you sort of an idea, here's a message that I got on email Friday, from somebody at -----, that I've never met, often you get these sorts of random messages. "Brewster: Of all the WAIS sources that I use, the one that I've found the

most valuable, without question, is the patent source that is at Thinking Machines. Yes, it's only two months worth, but I've learned an amazing amount, from just those two months. If anybody is thinking of building and maintaining a real patent WAIS source, it seems that this would be relatively easy, and highly profitable, even if they charged one tenth of what DIALOG charges." OK, so this just two months, that we got from the Patent Office, and put up on an example WAIS server a couple of years ago, and people use this stuff all the time.

I had a good, day-long meeting with the Patent Office yesterday, with a whole bunch of different WAIS people. And they're inclined to try to move forward with this. It turns out that the cost of going and putting all of the patents up, and having thousands of users access it, equipment, software, installation, is about $150,000. Holy crow! $150,000. One man- year. And you could basically go and set this stuff up, I know, because I sell them, and if you want to go and buy one, I'll sell you one. But there are other places you can go to as well. The prices have been dropping, phenomenally, so it's not just a mainframe issue, with millions of dollars going out.

Another area that we find very interesting and useful is the commercial publisher. During 1993, at the end of this year, we're going to start bringing up the first for-pay information sources on the Internet, using the WAIS technology. So that people can start using Z39.50 to find what they want, out of newspapers, magazines, journals, and start to pay for it. The Internet right now is pretty much a freebie world. And people are kind of used to that. But they're also really clamoring for higher quality. So there are those that want the higher quality. And the publishers are saying, hey, there are 5 million people out there, I can sell to, and why don't I try and do that. Now that's not to say that there aren't for-pay information services now, already, for instance DIALOG and Dow Jones make their information available. But basically the same old dumb terminal dial-up, feels like a horrible mainframe-at-a-distance kind of structure. But DIALOG has said that when they put this stuff up, it was about six months ago, about 3% of their users are now coming over the Internet, instead of going through the commercial data providers. What WAIS is, is a more sophisticated, easier, nicer-to-use thing.

The other thing that's happening now, is we're getting multiple vendors, coming in and working on the same protocol. We all have this mantra, "use the protocol, use the protocol." It's the thing that binds us together, even though we're going to be competing like nuts, to go and make the best servers, the best clients, the best information resources. So right now commercial vendors are really coming into the play, and we're starting to see products come out of a lot of different library vendors, and other search vendors.

The fun stuff. What are the fun things that are going on? The things that I find most interesting about the last six months, till the next year or two of developments that are going on, is that we're getting multiple languages. This used to be pretty U.S.-only

kind of stuff. It's gotta be written in English, it's gotta be written in ASCII. We're starting to get formatted documents, and searching in other languages. We're working with a Japanese partner, so that Japanese searching and retrieval can be done innately. German, Spanish, Italian, it's all happening, it's all based around standards like UNICODE or Microsoft Word, for bringing back a document in Russian, that you can go off and read.

Multimedia, we have images of pages already; we've got astronomy images; and starts of little dinky videos and audio feeds, that are starting to be moving around, on the Internet, through WAIS.

We're finding that developing countries are starting to participate, and the developing countries, isolated countries, the countries that are really using this technology the most, in my experience, are the ones that feel like they're left out in outfield somewhere: Australia, Singapore. They feel like they've been kind of left out, because it's too far away. And they say, "Ah, this is our mechanism of participation." So Australians are using WAIS harder than any other country other than the United States. Singapore is setting itself up to be a very major information country in the biology domain. So that's kind of neat.

And we'd like to get it to more and more of the third world countries, through network connections often going through satellites, through things like diplomatic channels, and then using that as mechanisms for setting up Internet resources.

The copyright issues are being solved. The best way to solve the copyright issue is for people to start making money, and not losing their shirt. Publishers are fairly easy to predict, like capitalists in general, right. They want to make sure they have a job next year, and hopefully they'll be paid a little more next year than they were last year. So making a mechanism for them to get paid, and mechanisms for protecting their intellectual property, are being solved. It's not going to be the end-all, but it's going to be good enough, to make it so that the Internet is not a frightening place.

Enhanced security systems are all part of this. Because it's not only for billing, but you also want to make some databases only available for certain people. We built an information system for the Perot campaign, which was great fun, and there's all sorts of database restrictions on access. You wanted some information to go out to all of the satellite offices, but there were some things that you wanted to just have particular people to be able to get to. So those are now being built into the systems in a variety of different ways.

So yes, this is a technology that is real, it's being used by lots of people. I recommend you get a real feel for it.

So what? My last slide. What's going on is this information dissemination approach is cheap, fast, global, and personal. This technology has dropped in cost phenomenally. The cost of going and serving a set of books, is on the order of $5000 for the hardware and about $5000 for the software, and you can serve gigabytes, a thousand books, to a worldwide population of thousands of users coming at you, for $10,000. These sorts of things just weren't possible when we printed things on slivers of dead trees. Electrons are cheap, and the Internet is an infrastructure that we can leverage. When people say well, "we're required to do cost recovery, for the incremental cost for distributing our information." I mean, well gosh, what's the incremental cost of most of these WAIS servers? The closest I can come to is a penny per copy, is the incremental cost for spinning your disk, or going and running your computer. Dirt cheap.

Basically, this is a mechanism to do everything -- the information distribution of our dreams and information gluttons' mechanism for getting at this stuff. It's fast. The Internet stuff, you can download a book in about 10 seconds. Pretty good! The sorts of things I was seeing, demonstrations at the Patent Office, you were flashing up pages of scanned images of pages 'cause we're starting to avoid ASCII these days; you scan the images of the pages, run it through optical character recognition, search based on the ASCII and pull back pictures of the pages. Basically, a mechanism for retrospective conversion of paper. It drops the cost of putting paper into a computer to close to xerox costs. So this is a mechanism for moving forward with preserving pictures and all that kind of thing. And the speed we were seeing was sort of: Flash, Flash, Flash, Flash, Flash for pages. You could flip through pages that fast with workstations. Of course, those of us who are poor Macintoshes and things, it's F_L_A_S_H ... ... F_L_A_S_H, ...But, it's getting there, OK. So, right now those of us on poor Macintoshes and PCs stay with ASCII and Microsoft Word but those on workstations, you know, get this sort of speed and it will be a year or two before scanned images of pages on any old workstations will do fine.

Another fact: it's global. We're already seeing lots of participation, from lots of different countries. And a key one, is it's personal. This stuff is driven by the reader. Instead of the publisher going and saying, "you've got to see this," this is oriented for the reader. It's what I want to see. We're setting up the better mechanisms for filtering things. How does WAIS fit into all of these systems? We get a lot of debates on the, gopher vs. WAIS, and Veronica vs. something else, and all these things. What WAIS is, is a mechanism coming from the publisher, towards the user. The publisher or the information resource. It's a big search and retrieval approach.

The idea is to have publishers put their information up once, with one protocol that's an international standard, and have all those people out there go out and make better user interfaces for getting at it. So, you'll get the gophers, the World Wide Webs, you'll get gateways into Compuserve, America Online, you'll get to lots of different user communities, by going and publishing your information once, on the Internet, using a standard protocol.

That's what WAIS is trying to do. It's moving from the publisher or the information provider out, and there are lots of people going the other way. And frankly, the interfaces that we've got now all stink, and the better ones are really coming out of places like XEROX PARC, and Apple Computer, NEC Computer, Microsoft -- that really understand how to build user interfaces. Are any of those available? No, not yet. Some of them are in development, some are being now, some of them don't even exist. But those are the environments, that the best user interfaces, I suggest, will come from.

What we as the federal government, commercial publishers, and libraries, should just do is make it possible for people to access our holdings. And luckily, the stuff is cheap. So why is it important? We started early. WAIS jumped in this area before there were any standards, really, for widespread access. We picked Z39.50 because of its committee, rather than its standard. The standard when we started on it was just basically for librarians, for finding MARC records, card catalog records, and frankly, our users couldn't care less -- they wanted images, they want full text documents, they want browsing, they want to search lots of different servers at once, and that really wasn't what Version 1 was about, but they said, "we'll swing with you, we'll go and figure out what it is you need, and help put it in the process."

Version 2 is basically making Z39.50 compliant with the Europeans, the ISO standard, and putting in some of the features that we needed for full text type things, and Version 3 is hopefully going to be what, if you pick up the standard and implement it, everything will interoperate.

So we're all completely concerned with interoperability, we're all implementing Version 2, and we keep that mantra, "use the protocol." And there are other pieces of the protocol that are coming along -- the URLs, URNs, security systems, billing standards, data exchange formats like SGML, are all being basically wrapped together into a working whole. One of the words that is commonly used for this working whole, is WAIS. But it's completely dependent on all of the people, a lot of the people in this room have spent years building clients, distributing them often for free, some of them are starting to be employed in this general area. We're basically starting an industry.

What I hope you get out of today is an idea of what WAIS is, what it isn't, get an idea of getting some hands on stuff, downstairs, of how hard is it to go and build information sources, and get them out, how hard is it to use the stuff that's out there, and I hope you go off and see that it's not just a technology that's stopping now, but that it's growing. Thank you.

FEDERAL INFORMATION LOCATOR

Eliot Christian
USGS

What is a locator? First, it's electronic. So for those in our society who do not have access to electronic information, they must be served on a walk-in basis or via surface mail by information specialists, such as librarians, who do have access to it. The locator we are talking about then is an electronic mechanism. It locates information, not in the sense that librarians think of a locator which tells you where something is physically so you can go fetch it, but in the sense of an entry that says that the USGS has an archive of all of the Landsat photographs and they are resident at the AIROS (?) Data Center and here is how you can get hold of them. That is what we are calling a locator. You might also hear the term metadata when the holdings are data. You might also hear the term meta-information.

The locator has very high level descriptive information. You might think in terms of a couple of hundred entries per agency;that is about how many we have to describe the holdings of the USGS, for example. Government-wide you are talking about 10,000 entries. It is high level information and it is not the information itself except in rare limiting cases such as the Consumer Price Index, which by the time you have information about it, you in fact have the information itself. That is not, of course, the case with something like the Landsat archives. So it is pointers to the information and not the information itself. It is all electronic. It is high-level information.

Once again in the federal government we are trying to make government information accessible to the public. There is something called the Federal Information Inventory Locator System or FIILS which was mandated by law several years ago. It was what was classical several years ago: it was a big centralized system. All the agencies were required to feed into it. It did not succeed. The reasons why it did not succeed are very well documented in a study that the Office of Management and Budget, National Archives, and the General Services Administration commissioned. The study was done primarily by Dr. Charles McClure of Syracuse. It basically said that the problem is that you've cut away the feedback loop: people are expected to feed into it, but they get no immediate value. The one centralized system is not what agencies use to manage their own business, so it is not well supported.

The Office of Management and Budget issued a press release with Circular A-130 which Peter Weiss talked about earlier. The press release stated that OMB is committed to promoting the establishment of an agency-based government information inventory locator system. The change from federal to government is not significant, but the change to agency-based is. What is now being said is that we realize that a centralized system does not work; if you can instead leverage off of the existing stuff that agencies use

anyway you can do a lot more and you can hope that it will be maintained because you are leaving the maintenance of the information with those people who care most about it, a basic principle of good management.

Let me jump into a Gopher-view of fed-space--an organization chart. There is a thing you've heard a little about already called the National Information Infrastructure. That term is awfully broad. There is an article this month in "Scientific American" called "Domesticating Cyberspace" which gives you a sense of it. The article talks about high definition television, movies on demand, optical fiber to the home, rolling back divestiture. That is not what we're talking about; that's the parent. Out there somewhere is the National Information Infrastructure. There will be legislation. Within the whole infrastructure there is a piece that is the responsibility of the federal government. There is a piece of that that's within the Executive Branch which is where the USGS as an agency resides. The Executive Branch has structured a group called the Information Infrastructure Task Force referred to briefly earlier. It is chaired by the National Economic Council. That should tell you something right there; this is a macro-economic view of information infrastructure, a little different than straight information dissemination or how information can enhance democracy, but valuable in its own right.

Within the Information Infrastructure Task Force three committees have been set up. The Department of Commerce heads the Telecommunications Policy Committee which will focus on issues such as the allocation of bandwidth, divestiture, the telco issues. There is another group called the Committee on Applications which is concerned with the High Performance Computing Communications initiative, funding specific research activities which would then have fall-out and be part of the information infrastructure in terms of doing the basic research so we understand how to do build these things.

The committee I want to talk about further is the Information Policy Committee. It is headed by Sally Katzen, who is the new Office of Management Budget Administrator for the Office for Information and Regulatory Affairs. The Information Policy Committee splits out into three group: one is concerned with security and privacy, securing the rights of citizens to not have their privacy violated by the federal government; a second is concerned with intellectual property, the copyright issues; the third is concerned with federal information dissemination. I think it is important that of all of the issues which could be dealt with under information policy, this administration sees getting the government's own information out to its people as one of the highest level breakouts. They have said, and you will see in Sally Katzen's press release, that there are three things that they are going to try to do, and I will mention a fourth one. The three things that they are going to try to do are: improve email among the agencies--many of you who are Internet surfers will be surprised to find that the vast majority of the federal government does not do email and even when we do we often use something called X.400 which is archaic; there is another thing which we are trying to accomplish within the federal government that's been in law for a long time, to get more

26

and more of the paper converted over to electronic form, things like your IRS forms or especially the booklets which tell you how to fill out the IRS forms.

The other one is to promote the establishment of the government locator system. The tasks will in all likelihood have guidance from OMB to the agencies, typically in the form of an OMB bulletin. Although we may also get higher level guidance because there is legislation now, the Paperwork Reduction Act for example has very specific things to say about how we do a government locator. We will build and operate a prototype locator. I think we already see the beginnings of that with a lot of the WAIS-based government information that's already out there, plus things like FedWorld which is a bulletin board approach, and some CD-ROM locators. We'll have to come to some agreement about metadata standards. All that really means is that if you are going to describe holdings, there must be some common handles. For example, maybe title, abstract, and cost would be the common descriptors. In fact, in one of the bills before Congress, these are the elements mentioned as required in the locator. There may be some additional items needed, but what is important is to come to some agreement about a common set of elements. That is what will be put out so that all agencies will publish their information that way, in addition to other ways that they publish for use in their own communities.

As I said, we are going to build on work already underway, but it is very important that we get lots more involvement of other inter-agency committees that are already in operation such as the Z39.50 implementors' group which will be talking to you next. In the area of the metadata agreement, we need to decide on our goals and approach, our primary and secondary communities. It turns out that if you view metadata from an archivist's viewpoint things like the technical contact for how to get information aren't really relevant because if you are thinking in terms of one hundred years later, why would anyone need the name of the person responsible for it. It's a different perspectives depending on what you are using the data for. We asked who is our primary community. Someone said it is everyone. Just literate people? Just English speakers? Somebody else said K-12 too. So we are going to try to accommodate, understand, and be explicit about our different user communities, interests, and capabilities. Again, it is important that we pay a lot of attention to those who aren't already part of the electronic age. We are going to get a document out for comments from as many people as we can get, talking about how we are going to do the metadata. We want a lot of public involvement in that. Again, re- emphasizing that input from the affected communities is going to be the key to having a locator that gets well accepted.

As a sidelight, there are a lot of folks who make money by fixing the fact that the government does not do a good job of providing access to its information. In some sense, we are competing with them so we have to make sure that we understand what people's agendas are and where they are coming from as we move into this. It is an exciting thing to do, a bit of a minefield, but we are going to be moving out on it sharply. I invite you all to get involved to whatever extent you can.

Z39.50: FREQUENTLY ASKED QUESTIONS SESSION

PANEL MEMBERS:
Ray Denenberg (Library of Congress/NetDev)
Jim Fullton (CNIDR)
Bob Waldstein (AT&T)
Les Wibberley (Chemical Abstracts)
Ralph LeVan (OCLC)

RAY DENENBERG: BACKGROUND QUESTIONS

1. What is Z39.50? What is Z39.50 NOT?
2. What is a client and server? Origin and target? What is a Z39.50 client and server? WAIS client and server?
3. How do Z39.50, TCP, OSI, and WAIS fit together?
4. How was Z39.50 developed? What are the different versions? What groups are participating in its ongoing development? Is there international participation?

Regarding questions 1 and 2, in terms of the client/sever model: if you start with a basic hypothetical information retrieval application, and assume that you view it logically as divided into two components, a user application and a database engine, the user application takes commands from the user and formulates those commands into queries that are understandable by the database engine, and the database engine accesses the database and formulates the results into a response that is understandable to the user application. The key is that the two components understand each other. If you then view this in terms of the client/server model, you have a client system and a server system. You can consider the user application to be the client. You can consider the database engine to be the server. The two are split across two systems, with the line representing inter-system communications.

The client/server model as represented is fine as long as the client and server understand each other even though they are split across two systems. It's not necessary to this model that they be split across two systems; they could be on the same system and be different processes, in which case the line would represent inter- process communications. But we like to think of them as split across two systems so we can talk about them as a client system and a server system.

We want to address the case where the client system and the server system don't understand each other, because we may want to have client systems which can talk to a variety of server systems, servers which are accessible to a variety of different clients. What is needed is some translation capability. The key is that both the client and server translate into a common format and that only one instance of the translation capability

29

must be implemented. The translation capability which we are talking about is Z39.50. Z39.50 is the protocol for communications between an information retrieval client and an information retrieval server. Z39.50 is a specification which is divided into client- and server- like components referred to as the origin and the target. The origin is interfaced with the client; the target is interfaced with the server. The Z39.50 origin and Z39.50 target communicate with one another according to the Z39.50 protocol.

Once the Z39.50 protocol is introduced into the client/server model discussion, then you must be careful about the use of the terms client and server because people use the terms client and server to mean the client system and the server system, or the client application and the server application, or the client application together with Z39.50 origin and the server application together with the Z39.50 target. So, in order to answer the question of what is a Z39.50 client and server, the context must be known. If you really mean the Z39.50 origin and Z39.50 target, it is probably best to use those two terms.

I'll return to this discussion later, but first I want to address the second part of question 1: what is Z39.50 NOT? I may not be able to answer this fully, but it is just as important, or maybe more important, as the answer to the question of what Z39.50 IS. For one thing, I mentioned that there was one element missing from the previous example, and that was the translation capability. In other words, the client application has to translate to the common representation; and the server application has to translate to a form that is understood by the Z39.50 target. That can be quite a bit of work. That aspect, the translation, is NOT part of the Z39.50 standard. The standard only addresses the protocol for communication between the target and the origin.

A couple of other things that Z39.50 is NOT. It is not a user interface or a command language. It does not specify any dialogue between the user and the user application. It is not a database management system; it is not a database.

Back to the question of the use of the terms client and server. If you want to refer to a WAIS client and a WAIS server that is fine. WAIS incorporates Z39.50, so you can think of the WAIS client as being the application together with the Z39.50 origin or the WAIS server as incorporating the Z39.50 target.

That covers questions 1 and 2. Question 3 covers the relationship among Z39.50, TCP, OSI, and WAIS. OSI provides a seven layer reference model. That reference model is used, among other things, for the description of protocols. Z39.50 is an application protocol, which means that it provides direct support to the end application. So Z39.50 is at layer 7, which is the application layer. At layers 3 and 4 is TCP/IP. TCP and IP are two distinct protocols which reside within the OSI framework at layers 3 and 4. Almost all of the implementations today run Z39.50 directly over TCP/IP. However, there are alternative OSI protocols that are equivalent in functionality but not compatible with TCP and IP.

30

At layer 6 where nothing is pictured and at layer 7 there are two additional protocols which merit brief mention. The reason being that, as the Z39.50 applications continue to evolve, we expect the two protocols which I am about to describe to become increasingly important. At layer 7 there is what is called the association control protocol which, if used, would be used in conjunction with Z39.50 at the application layer. What it is used for is to specify application context; the TCP analogy is to use well-known ports. Many of us doubt that for the long term that that will hold up, to be able to develop Z39.50 for multiple applications on a single host. Also, the presentation protocol which I won't discuss extensively except to say that people may begin to realize that it is necessary to be able to negotiate the different syntaxes to be used during a session. Les will talk more about syntaxes which is very important element in Z39.50, the ability to represent the different types of record syntaxes which must be dealt with during a session.

To complete the OSI or reference model picture: Typically an application is pictured to reside at the top of layer 7. So, if you consider Z39.50 an integral part of WAIS, you would picture WAIS as an application residing part in layer 7 and part above the seven-layer reference model.

On to question 4: There is Z39.50 which is an American National standard; there is a corresponding and compatible international standard called Search and Retrieve (SR). Z39.50 was first balloted in 1984; that ballot failed. It was re-balloted in 1987; the 1988 version was approved by ANSI in 1988. In parallel, the ISO search and retrieve (SR) protocol was introduced in 1984. It was approved in 1991. So though there was a strong attempt to coordinate these two protocols, because of the timing, by the time the SR protocol was approved there were incompatibilities between it and the 1988 Z39.50 version. There was an effort to align these two protocols. Version 2 which was approved in 1992 was more than an attempt to align Z39.50 with SR; it provides a number of features beyond SR. Z39.50-1992 is a compatible superset of SR; it incorporates features that the implementors demanded be put into Z39.50 in order to make it economically viable for them to implement. In 1990, the ZIG, the Z39.50 Implementors Group, was established, and the Library of Congress was designated as the maintenance agency. These are two independent groups which work very closely together. The maintenance agency's immediate mandate was to produce version 2 and to achieve compatibility with SR. Once that was accomplished in 1992, the maintenance agency in close coordination with the ZIG began work on version 3 which is projected to be available in 1994.

5.   What is the "WAIS protocol"? Is there such a thing? Is there a "WAIS specification"? What is the process for developing the WAIS protocol/specification? Is there a process analogous to the Z39.50 process?

6.   What is the relationship between WAIS and Z39.50? The difference? Can WAIS be described as an application of Z39.50?

7.   What is the relationship among the versions of Z39.50 with respect to the versions of WAIS? Which Z39.50 versions are compatible with which WAIS versions? What are the long-term implications?

8.   What capabilities do you gain by using WAIS instead of Z39.50? What capabilities do you lose?

9.   What are the relationships among Z39.50, WAIS, WWW, Gopher? How does Gopher use WAIS? How does Gopher use Z39.50?

10.   How and when will these various tools be harmonized?

11.   How do you use Z39.50 and/or WAIS to discover Z39.50 WAIS servers? Can Z39.50 be used to build a server navigation tool to discover and navigate among resources?

12.   What are the hardware/software components that make up a WAIS/Z39.50 system? What development tools are available? How are WAIS and Z39.50 integrated?

Regarding <u>question 5</u>, "What is the "WAIS protocol"? Is there such a thing?" I like to use the term WAIS protocol suite instead of WAIS protocol because there is more to it than just one particular thing; there is a collection of communication standards and document identification entities that are built into it that make it work. WAIS consists of the Z39.50 protocol engine version 1 along with some additional items which are required to have an information publishing system. Just having a protocol by itself is useless; you have to have a lot of additional stuff built around it that actually lets you describe the way documents are presented to the user, that lets you locate documents and data objects on the server, and things of that sort. So I like to talk about a suite of protocols, and one of those is Z39.50.

<u>Is there a "WAIS specification"?</u> The best way to describe the WAIS specification is the WAIS source code; if your code works with that code, then you've followed the WAIS specification. There are some documents which describe some of the various data structures and components that are associated with the Z39.50 protocol engine in WAIS and those are available. The actual description of the bit streams that go across the network is not on paper or, if it is, I am not aware of it.

What is the process for developing the WAIS protocol/ specification? Is there a process analogous to the Z39.50 process? The WAIS protocol and specification was developed when Brewster put the project together. They designed what they wanted and implemented it and came out with what we know and love today. There isn't a standards process analogous to the Z39.50 process. There isn't an implementor's group or a standards body which meets and approves what is being developed in the WAIS world.

Ray has answered question 6: What is the relationship between WAIS and Z39.50? Z39.50 is the protocol component of the WAIS system. Can WAIS be described as an application of Z39.50? I would say yes.

What is the relationship among the versions of Z39.50 with respect to the versions of WAIS? These are apples and oranges approaches. Z39.50 is the underlying protocol engine which underlies the other components required for a functioning information system, a functioning application. The current freeware release of WAIS is based on Z39.50 version 1 and the work we are now doing is to try to attach a Z39.50 version 2 protocol stack to that. It is not a replacement for the version 1 stack but it is an extension of it.

Which Z39.50 versions are compatible with which WAIS versions? That's a loaded question because regardless of which systems you use it's possible to put together gateways which allow one system to interact another system. Ralph will discuss this further. Right now WAIS is Z39.50 version 1-compliant. Systems which are compliant with Z39.50 version 2 will not directly communicate with WAIS servers yet but that is a problem which is being worked on. I anticipate a fully compatible version 2 in the near future. I can speak for CNIDR and Brewster is nodding his head that WAIS is doing something similar.

What are the long-term implications? There are some very important long-term implications. When everything is version 2 or version 3 compliant, WAIS systems as well as other Z39.50-compliant information systems will be able to interoperate at least at a basic level. If you have a client that is for information system A and a server that is for information system B, then they will be able to talk to each other so that you do get some general inter- operability between systems, which means that the client that is on your machine will be able to interoperate with lots of different systems on the network regardless of who you bought it from or what its original intention was.

What capabilities do you gain by using WAIS instead of Z39.50? What capabilities do you lose? Once again, I think this is an apples and oranges questions. Since we are discussing a protocol and the different versions of a protocol versus an application which makes use of that protocol, it's not something that can be compared in the context of this question.

What are the relationships among Z39.50, WAIS, WWW, Gopher? How does Gopher use WAIS? How does Gopher use Z39.50? Z39.50 is a protocol; WAIS is a system; Worldwide Web is a system; Gopher is a system. None of the three systems use the same protocol, but they all interoperate through gateways. You can generally make systems interoperate through gateways without a tremendous amount of difficulty. Sometimes you lose some functionality depending on how well the gateway is constructed, but typically you can make systems interoperate.

That answers how Gopher uses WAIS. Gopher uses WAIS through a gateway. The Gopher client connects to a gateway which speaks Gopherese and this gateway converts the query issued by the Gopher client into something which can be understood by the WAIS server. Essentially, it is a Gopher server connected to a WAIS client, some translation takes place in the middle, the query is sent, and answer is returned, more translation takes place, and a response is given to the original query.

Gopher and Z39.50 work the same way although the gateways are not as commonly used. Since Gopher is used frequently in Campus- Wide Information Systems, there is a strong desire to make Gopher clients capable of accessing Z39.50-based systems that are used in libraries. People want to be able to get to card catalogs, people want to be able get to non-bibliographic information stored under Z39.50 systems. So gateways do work. I don't know where it is but I do know that a Gopher client like the one described exists.

How and when will these various tools be harmonized? Harmonized is an interesting word because there are lots of ways to harmonize tools. You can either create an application that talks to lots of the different applications through the use of different protocols; one example of that is NCSA Mosaic. You get one user interface that lets you operate natively with lots of different tools because it is essentially a collection of clients in one package sitting on your desktop that goes out and talks to different systems. The advantage of that is everything looks the same, you have one tool sitting on your desk and you know how to work it for all of the different system. The disadvantage of this is that you have a really big client and if one thing changes, then you have to go and change your application and redistribute it to everyone, you can't just change and redistribute parts. Another way to do this is through a gateway. The advantage of a gateway is that if something changes only the gateway must be changed. The disadvantage is that you can lose something with a gateway. A gateway does not always represent the richness of the data that can be accessed using the native application.

How do you use Z39.50 and/or WAIS to discover Z39.50 WAIS servers? Those who have used WAIS know that there is a directory of servers which can be queried. The server returns a list of information sources or servers which seem relevant to the query, and then those information resources can be accessed. Systems that are based on Z39.50 are applications, and the way that you find resources on the network is

34

applications bound--it depends on how your application wants to allow it. If you were to put a new protocol engine into WAIS, the system for finding resources would not change because it is an application-bound process as opposed to a protocol-bound process. It is a question of what information you send between the client and the server which allows you to locate resources.

Can Z39.50 be used to build a server navigation tool to discover and navigate among resources? Yes. You can use Z39.50 to build a server navigation tool because the important thing is the information that you are exchanging and you can use the Z39.50 protocol to exchange all of the information you need to be able to locate resources on the network. Once again, it is an application problem.

What are the hardware/software components that make up a WAIS/Z39.50 system? You need at least one computer; to extend that, you need two computers and a network. Computers have gotten really cheap. You can go out and buy an incredible workstation for a small amount of money which will allow you to provide access to lots of information. Clients for systems which are based on Z39.50 including WAIS are available on the network for PCs running Microsoft Windows, DOS, or any number of different operating systems, all you have to do is get them and use them.

What development tools are available? Most of these applications are written in C, and you need to be a C programmer to be able to develop applications.

How are WAIS and Z39.50 integrated? Z39.50 is the protocol stack for WAIS.

BOB WALDSTEIN: Z39.50 IMPLEMENTATION(S)

13. Who currently has implementations, production or otherwise, of Z39.50?

14. What are the various Z39.50 platforms? For origins? For targets?

15. What programming languages and other tools are used for building Z39.50 implementations?

16. When are non-bibliographic implementations likely to be available?

17. What are "self-describing" targets? Origins? How does an origin learn the details of what a target supports?

18. Could Z39.50 be used for a CWIS system? What enhancements are needed (and being developed) in this respect?

19. How do you build clients that access both WAIS servers and ordinary Z39.50 servers? How do you build servers that can be accessed by WAIS clients and ordinary Z39.50 clients?

The implementation I know best is mine. I have between 80 and 100 databases my users use; we have about 50 to 60 databases which are internal such as the circulation database. We have between 2,000 and 3,000 users of the database, with a potential population of 100,000; this is an internal system and not for outside use.

Commercial implementations of Z39.50 version 2 1992 are available for sale from OCLC and RLG. People are already contracting with them. Penn State says that it has 70,000 people using RLG's system through a server and it is working perfectly. People don't know that Z39.50 is there and everyone is very happy with it.

From my perspective, it is very important that all of the library vendors are buying into Z39.50. When you go to your local catalog in your local library, technically all of those catalogs will be able to link to every other catalog everywhere else. All of the big vendors I know about are paying attention.

The other thing that is important to me is that all of the major information vendors are paying attention to Z39.50. Mead has stated a date when they expect to have a Z39.50 system available. Chemical Abstracts and BRS are talking about systems. Dialog appeared at the last ZIG meeting. All of the major information providers that I want access to are starting to appear at the Z39.50 meetings.

My stuff runs under UNIX. The nice thing about platforms in terms of targets is that I don't care. RLG is running under whatever RLG is running under; I talk Z39.50 and it works fine. You only care about the platform if you are buying something.

In terms of origins, I plan to get all of the free code. My stuff all works under UNIX systems. The other thing interesting in my world is that I am the only application I know running over DataKit and not over TCP. That is important to me because it means that my modems are hooked to DataKit which means I'll be hooked to modems probably within the next month or less and I won't have to rip apart source code and replace modems.

All of my stuff is written in C.

Most of my databases are non-bibliographic. A few are bibliographic, but most are non-bibliographic. Chemical Abstracts is going to do all kinds of slick stuff that is non-bibliographic.

My clients are totally stupid. My clients do not know MARC. If you connect with my client and it connects to someone and if the only thing that person delivers is MARC, the only thing my client knows to do is take it apart and present the 001 field followed by the 002 field complete with all the subtags and it looks awful. And the vendors have complained to me that my users use my client and it accesses them and it looks awful. I

have now fixed that. My clients now learn through a thing called "Explain" how a database is structured and presented, and now everything is starting to look nice with pop-ups that tell the users what is needed.

Dartmouth is doing what sounds to me like the most complete gateway system that I've heard of: they have their own protocol from their MAC clients to a gateway and that gateway talks every protocol that I know of--Z39.50-1992, WAIS, Gopher, and all the others.

John Kunze of the University of California, Berkeley, is the source of the only public domain CWIS using Z39.50 version 2. There is also Project Mercury at Carnegie-Mellon which is Z39.50 based.

LES WIBBERLEY: INFORMATION RETRIEVAL

20. What are the Bib-1 and Info-1 attribute sets?
21. Are there attribute sets under development for non-bibliographic applications?
22. Indexing is not implemented in a standard manner across systems; does Z39.50 address this?
23. Does Z39.50 only retrieve MARC records? What if I have other types of records to retrieve?
24. What is a "record syntax"? "element set"?
25. How do WAIS and/or Z39.50 handle text records, and the different ways they are represented (ASCII vs. EBCDIC, newline vs. carriage return)? How does Z30.50 differ in this respect?
26. What types of data can WAIS index and retrieve? Z39.50? How is data prepared for retrieval by WAIS? How does this differ from Z39.50? Are there fundamentally different premises of Z39.50 and WAIS in this regard?
27. If information is searchable/retrievable by WAIS, can a Z39.50 origin also access it?

Within Z39.50 there are some standard query formats that say how to express a question. One of them is called the "reverse Polish notation" query. Within that query structure, search terms are identified by something that is called an "attribute." So when you hear the term attribute, an attribute indicates what kind of information is being included in a search term. Is it an author, is it a title, how do you want to use this in searching? Z39.50 includes a built-in attribute set called bib-1 and that is oriented towards bibliographic searching, but the protocol is modular in that different conventions can be plugged in. A different attribute, for example, for scientific and technical searching can be plugged into the protocol modularly. So that is what the concept of an attribute is. There are many kinds of attributes: one is to tell how the term is used; others indicate relation; the structure of the search term, is it a word or phrase; is it truncated. So it allows you to very explicitly indicate your search terms and indicate what kind of terms they are.

Are there attribute sets under development? Yes, there are and what I'm going to show you is an example of another non- bibliographic attribute set. This one is called the scientific and technical attribute set. It is a listing of search terms within databases which carry scientific and technical information. For example, there are patent numbers, patent application dates, molecular formulas, boiling points, chemical names, as well as the traditional abstract title.

Does Z39.50 only retrieve MARC records? (Question 23) No, there is a concept within Z39.50 called record syntax and when you request to retrieve information via Z39.50 you can request how that information is packaged. In brief terms, the record syntax is how do you package the information. One packaging for bibliographic information is called a MARC record. Another type of packaging is called generic record syntax which allows you to tag individual fields with very detailed information about whether it is gif, or tif, or whatever. So there is a lot of flexibility which can be plugged into the protocol for delivering a variety of different types of data.

How do WAIS and/or Z39.50 handle text records, and the different ways they are represented (ASCII vs. EBCDIC, newline vs. carriage return)? How does Z30.50 differ in this respect? (Question 25) How Z39.50 handles text records is fairly straight forward; it is one particular record syntax. There is a record syntax which we are in the process of standardizing right now which says that if you want to send text data, you send it in this way. That will be part of the standard in the appendix.

RALPH LE VAN:

One of the issues is the question of whether there are commercial Z39.50 products? OCLC has been selling access to its databases via Z39.50 for sometime now. We are also selling a UNIX- based system that includes a database engine, a Z39.50 server, that server acts as a gateway so you can use it to access your own databases or get to other people's Z39.50 servers, and it includes a client. So there are people trying to make a business out of Z39.50 applications right now.

MISCELLANEOUS:

These questions were not addressed due to limited time.

28.   Can a Z39.50 origin search multiple targets during a single search?
29.   How do you access a particular Z39.50 application on a remote server, via TCP?
30.   Is there an RFC for Z39.50? WAIS?
31.   Is WAIS being implemented internationally?
32.   What is a doc-id (WAIS)? A URL? Is anyone using URLs in Z39.50 or WAIS?
33.   What is Z39.58 and how does it relate to Z39.50?
34.   What security measures are provided by Z39.50?
35.   How does Z39.50 apply to special characters and foreign languages? Unicode?

INTERNET MULTICASTING SERVICE

Carl Malamud

I plan to do two things: I'm going to tell you a little a bit about the Internet Multicasting Service, and then I'm going to compare WAIS to a service which at a first glance looks totally different and show you why they are actually doing the same thing and why I think both of them will work. And maybe we can get some lessons out of that for some of the projects that you are working on.

The Internet Multicasting Service is a non-profit located in the National Press Building along with all of the other press organizations. I'm right next to the Kansas City Star. We're a little bit like the Public Broadcasting System although they are a lot bigger. You are looking at the entire full-time staff. We have a few part-time stringers, contractors, and a system administrator. We like to think of ourselves as "the flame of the Internet." We are a press organization; we publish information on the network. We publish about 200 megabytes per week of data. We are subsidized by people in industry and foundations; we don't have any disk drive manufacturers as a sponsor yet but I'm confident that we'll get some soon.

We run two channels: Internet Talk Radio and Internet Town Hall. Both of those are regular sources of data on the network. A lot of that data is audio files. Internet Talk Radio started as strictly an audio metaphor. What we do is publish standard audio. We take shows from National Public Radio which we syndicate just like any other group would syndicate, and we put those files on the network. Internet Town Hall is related to Internet Talk Radio; it's also a source of data on the network. It's general public affairs programming, and we do a variety of special events. I'll talk more about a couple of those.

Internet Talk Radio is my reaction to journals like "ComputerWorld," "InfoWorld," and the other groups in the trade press which provide zero information in my opinion. If you pick of "InfoWorld" it might tell you that a new product was introduced, but it doesn't tell you if it works, if it's useful, or what the underlying technology is. You might find an article on WAIS in one of those publications, but you are unlikely to find an article describing what Z39.50 is, let alone one that describes the subtle variations. We are trying to address that gap. Our audience is primarily engineers; this is highly technical programming. Think of it as MacNeil-Lehrer meets Bill Joy. Bill Joy is the founder of Sun Microsystems and its punk-rock engineer.

This is very technical information. We are doing an interview this week on "Geek of the Week," our flagship show, with Stewart Vance of TGB Software on different ways of doing IP encapsulation and how that relates to the next generation of work for the Internet protocol. Good if you like it; otherwise it's just a lot of extra data.

How do we do this? We're just like any other radio station except we don't use airwaves. We use a fiber optic link to the Internet. UUNET is our main service provider. We have a 10 million bit per second link to UUNET. I have mostly PCs and a SPARCStation in my facilities. I get better performance talking to the outside world than I do on my internal LAN right now because the PC implementations aren't good but when my SPARCStation talks to another SPARCStation it runs very quickly.

We have a variety of professional broadcasting equipment, digital effects processors and DAT decks and digital editing studios, which we use to produce radio. We capture the radio show as a digital file at 48 kilohertz; a half hour of that is several hundred megabytes of data. We sample that down to 8 kilohertz, which is the equivalent of what a good phone line sounds like. It's not stereo quality but it's good enough for radio.

What most of my listeners do is listen to our show while they are doing something else in the morning. If a phone call comes in, they put the show on hold because it's not really radio, they answer the phone call, and restart it after the phone call.

We do a lot of field recording. Our studios are just getting set up. We are going to begin doing live video onto the Internet by September or October. Most of what we record right now consists of going to a meeting such as this one, interviewing someone like Brewster Kahle, and taking that interview home where we edit it and clean up the sound.

Basically, what we do is publish files. Some of it's text, some of it's audio. We'll be looking at structured databases. We are also looking at and will be making an announcement in a few weeks about making some sources of government data available which are not currently available.

Once we've processed the files for Internet publication, we take those files and move them to UUNET, the Mother of all FTP servers. They make about 6 gigabytes of storage available to us. UUNET gives the data to IIJ, which is the Japanese network provider and to EUNET, which is a commercial provider in Europe. From there it goes to secondaries: NASA, for example, gets its feed from UUNET, as does Energy Science and ANS. ANS in turn gives it to other networks. From here it goes around the world.

I don't maintain a distribution network. All I do is put the data in one place. It reaches 30 countries. It has a listenership of 100,000 who have taken the time to learn how to download 30 megabyte files and play them on their SPARC or MAC or PC.

The second channel is the Internet Town Hall, a public affairs channel. If you listen to the National Press Club luncheons these days, the President introduces guests which might include Senators, Cabinet members, and recently the Dalai Lama. They welcome their members, the guests at the luncheon, their viewers on C-Span, and they

welcome their listeners on National Public Radio and the global Internet computer network. We are one of the three networks which take those luncheons and put them on the network. A lot of those are available as archives now. There are a lot of servers keeping that data. It's possible to do WAIS searches of the README files and find that the Dalai Lama appeared on Internet Town Hall on a particular day and pull the file.

A 30 megabyte file sounds like a lot, but once you get to your Ethernet which is 10 million bits per second it's not a lot. A sound file is 64,000 bits per second, so you're using a small portion of your Ethernet or your FDDI ring. There are a lot of corporations such as Sun Microsystems (which runs a radio station) which take the files, queue them, and multicast them over their net on a regular basis. It's not that big of a bandwidth hog.

We do a variety of special events when we have the budget, time, and inclination. What we are trying to do with these special events is demonstrate what the Internet is and how it can be used. We're trying to do that for new audiences. We're trying to talk to congressional officials, or national public radio stations, or to children, and tell them about this new tool, the Internet.

We also try to push the technology a bit on some of these special events. The Internet is fairly robust but when it comes to moving audio or video real time over the network, it doesn't quite work yet. Some think if it doesn't work yet, we shouldn't do it. But if you look at the first radio network which was done by the National Broadcasting Corporation, there were 400 engineers from AT&T and NBC standing by to make that network happen. So the way to learn to make this technology go real time on a frequent basis is to bring in the engineers and have them hack it together the first time. So a lot of our special events try to provide a stage for people from XEROX Parc and other similar research institutes to come in and do a little playing.

A couple of examples: A couple of months ago we did the Global Schoolhouse Project on behalf of the National Science Foundation. Over thirty organizations got together. The idea was very simple: there were kids sitting there with their MACs; Apple was very generous and donated machines to four schools--one in California, one in Tennessee, one in Virginia, one in England. The children learned about the Internet, sent mail to each other, did research on the environment, read Al Gore's book, did original research in their communities on what could be done about the environment. Then they did a video conference over the network. They were able to brief White House and NASA officials on what they thought the government ought to be doing. We view that as a prototype of what an Internet Town Hall might be: a group of citizens, a group of leaders, an issue, people go off and do their research, and they have a dialogue. This is not a one-shot deal, where someone asks the President the first question that comes to mind on first meeting him. Rather the citizens use the network to span time and do some in-depth research, the Town Hall spans time, the citizen have time to brief the leaders, and the leaders to brief the citizens, and a real dialogue can take place.

41

A fun example of this recently which involved Brewster Kahle was National Public Radio meets the Internet. We linked the Internet to National Public Radio's "Talk of the Nation Science Friday" for an hour of live radio. Ira Plato was the host and he sat in New York and took questions from the Internet. He took questions two ways. One is I took a Radio Mail terminal with me and we took email from the world and demonstrated that with one thin line, a 9.6 modem, we could bring in 300 questions from the outside world in a short period of time. When you do interactive events, the limiting factor is how people can participate. What we were trying to show is that in one hour on a single line, 300 people got their comments in. So rather than favoring the person who has the speed dial button, you can have equal access as this is a much fairer way of people getting their questions submitted. We also demonstrated audio coming in from the Internet. Ira was the perfect host. He would say, "Let me get this straight. Do you have a telephone there?" "No, I don't have a telephone." "Well, how are you talking to me?" And the person he was talking to would respond, "Well, I'm in front of my computer; I'm talking to it."

This is a technology that we'd like to see the radio and television communities begin to adopt. The reason is that they are the professionals at producing information. These are the people that produce information for a living and I think that it's vital that we get these folks on the Internet because a lot of us are amateurs at producing information or professionals at producing catalogs of information. But when it comes to the highly produced sources, these are the folks that we need to get on the network, and not just for email but for programming.

Brewster asked me to do a "blue sky" or "what's going to happen tomorrow," but I have no idea what's going to happen so let's look at the past instead.

WAIS is one view of the world and it has some nice attributes. It's decentralized, no one database is in control of the other databases. It's also distributed in that there are many databases. You could have centralized control over a distributed environment. WAIS wisely is a bunch of independent databases tied together in a transparent fashion.

In my view, it does three things. It's a transport mechanism, Z39.50, a way of allowing a client to talk to the server. It is a referral service so that it tells you that there's another server on the other side of the world which has something you might be interested in, or, in WAIS terminology, that there's another database, another ".src" file. It's also a language for talking to those servers. So it does three things and it does them very simply. You don't need to do a lot of user training.

It's a view of the world but it's one of several views of the world. And, as we know, it's very important not to ignore those other views. When we look at Worldwide Web, Gopher, and things like NetFind, whois, and finger--all directory services for finding people--we see that the ones that work all have the same attribute. They look easy to the user. Mosaic is a very easy interface to the Web. The reason Gopher works

is because it's a menu system. You pick any item and you get another menu. I can train even senior managers on Gopher in five minutes.

So the ones that work have small, easy to establish nodes. You don't have to solve the entire problem in order to get up and running. That's crucial. A lot of you are professionals working to put large databases together. It's very tempting to say I'm going to put my organization online, to make the entire organization go online at the same time. To me, that's a recipe for disaster. It's much easier to find one small database, put that one online. Maybe later, we'll have problems with compatibility but at least we'll have something done.

WAIS has a simple, transparent interface. X.400 has been a dismal failure because the address is too big to fit on a business card. You contact an X.400 user by picking up the telephone. That's because the X.400 address is too long.

Just as important is that WAIS is built over today's transport. One of the geniuses of the original WAIS team is that they looked at the Z39.50 work and they said that this is very important but it's not quite ready yet and we're not going to wait. So they ripped out parts of Z39.50 and they invented the WAIS version of Z39.50 and used that. That's causing them some problems now. Brewster is spending a lot of time going through and adding in total Z39.50 compatibility. But it's up and running and that's why you are all here today. It's tempting to say that this won't work until a standard is ready. We can say we've got to have X.500 because without a global directory what can we do. You can do a lot of things that might not scale but at least you got started.

So I'm going to compare this to a totally new kind of service. Those of you who read the "New York Times" a couple of days ago or the "Washington Post" on Monday might have seem some trouble that myself and a colleague, Dr. Marshall Rose, are causing. We've invented a new domain. My domain is radio.com. We have a new domain called tpc.int. You may never have heard of the international domain; there actually is another organization in ..int and that is NATO. And so NATO and our team are the two and we are both fairly dangerous, and in some ways I'm more dangerous than NATO these days. What we're doing is an experiment in remote printing built on top of the electronic mail infrastructure and there are a bunch of printer gateways. You will say why would I want remote printing. We can send three different kinds of documents: Postscript, Ascii, and TIF. For purposes of our printing experiment, a printer is any G3 facsimile device anywhere in the world. What this lets you do is send electronic mail and reach any fax machine. We don't have the whole world yet, but we do have Japan, Australia, the Netherlands, Ireland, Sweden, and a lot of the U.S. Organizations like Sun Microsystems now are serving their own organizations. What they are saying at Sun is that I'm not going to spend $.06 placing a local call to two people I don't know, some sender on email and some recipient on a fax machine, but I am willing to do it within my own PBX. So the user sends mail to phone-number.tpc.int. They don't know about remote printers; all they know about is the target they are trying to reach. You might call this global bypass. We prefer not to use that term.

So how are WAIS and tpc.int similar? They are both built bottom-up; they are both decentralized. We're not telling people how to operate their gateways. We're just saying that if people have a message and they can image it on their fax machine, do it. There are many different models of remote printer operation. Some like Sun will do it within their organization. They have a salesman who won't use email. Our service lets customers on the Internet send him a fax. NASA Ames Research Center is using it as a way of reaching some of their people who are not on email yet. Others are running gateways as a public citizen type of enterprise, as a way of reaching out to a neighborhood, so they are running neighborhood gateways. Other folks are looking at this and saying that they can make money with it. We are allowing gateways as part of our specification to use one-third of the cover sheet and lease it as advertising. Junk fax? No, by letting a third party pay for that service it makes it feasible.

So, what are the lessons? Grass roots is good. If you are trying to get your organization up, it is tempting to look at an organization which has compatibility problems. I've found that it's a lot easier to clean up after the fact than to plan something beforehand. So, my message is to avoid central policy. You want standards, but avoid the temptation to do just that. Show by example and not by memo.

If you want to learn more about the remote printing experiment, send an email to tpc-faq@town.hall.org.

Other Internet Multicasting Service Resources

MBONE: isi.edu:/mbone/faq.txt
Audio: ftp.cwi.nl:/pub/audio/
CU-SeeMe: gated.cornell.edu:/pub/video/
PARC: parcftp.xerox.com:/pub/net-research/
LBL: ftp.ee.lbl.gov:/
ITR Sites: sites@radio.com
ITR Info: info@radio.com

EISENHOWER NATIONAL CLEARING HOUSE
FOR MATHEMATICS AND SCIENCE EDUCATION

Len Simutis, Director
Nancy O'Hanlon, Associate Director for Library and Information Systems

LEN SIMUTIS:

I am pleased to have the chance to speak with you today about the Eisenhower National Clearing House for Mathematics and Science Education. We were established at the Ohio State University last October with funding from the Department of Education's Office of Educational Research and Improvement. Our mission is to get useful and effective K-12 mathematics and science curriculum materials, which are tied to systemic reform efforts nationally, into the hands or at the fingertips of teachers and students.

The federal government supports an incredible amount of development of curriculum materials and programs, and, for whatever reasons, that material is not getting into the hands of teachers and students. So our role is to identify, gather, catalog, and distribute curriculum materials and programs, the materials themselves. We are doing that by creating a physical repository of the materials in Columbus, Ohio, and an electronic repository as well to distribute those materials in both traditional print formats as well as in multimedia formats, on demand in print format, on demand in fax format, in CD-ROM format beginning in 1995, and via the Internet.

We are funded through the U.S. Department of Education and we are expected and will work very closely with the department as it puts together its nationwide networks of Inet and Smartline. We are working as well other federal agencies. While we are funded by the Department of Education, we are expected to work with all federal agencies which are involved either directly or indirectly in the development of materials which could be useful in K-12 math and science education. We are working most closely with a group called the Federal Coordinating Council for Science, Engineering, and Technology with the wonderful acronym FCCSET. This is an inter-agency effort to identify and distribute programs which support mathematics, science, and engineering education. We are working as well with the regional education laboratories established some fifteen to twenty years ago across the country, with the new group of Eisenhower Regional Consortia which are ten organizations distributed regionally working with us to support mathematics and science education, with other database providers, and with commercial publishers.

We believe that we have to build this system around the key elements of interoperability and standards, that we will be a key source of information about K-12 math and science, but that we will not be the only source. There will be information

available from other database providers and from commercial publishers. Scholastic has announced a network in the last couple of weeks for teachers. The National Education Association has announced that it will be developing a network via America Online to support teachers. A whole host of people are and should be supporting math and science reform. We need to develop a framework which will reach all those people.

So one of the design elements of this project is to begin with the notion of interoperability to create what we are calling a federated database. We have offered and we are seeking additional support to allow us to bring together participants or groups which are representing math and science education providers to develop a framework within which we can develop a way of exchanging information via protocols and standards. We are beginning with a database architecture built on the Z39.50-199x standard. Our RFP said Z39.50-1992 but we plan to stay as current as possible in the implementation of that standard. We need to work toward the adoption and use of common thesauri and descriptors. Nancy O'Hanlon will address this in more detail. We hope that will be helpful to you as you see how we are trying to approach these problems. We also need to look closely at document and media interchange formats which have been referred to frequently today.

We will be creating a catalogue of curriculum materials and programs. We will be appending to those catalogue entries evaluations of the materials, both systematically collected evaluations and anecdotal evaluations by teachers and others. We will be creating text files to the degree we are able to obtain rights to the redistribution of the materials developed under federal support or others, we want to be able to make those files available. We will be cataloging and distributing, again with the appropriate rights, computer programs, image files, and eventually videos. By the third year of our work, early in 1995, a subset of the materials we are collecting will be distributed in CD-ROM nationally. We are creating as well, with the help of Aspen Systems of Rockville, Maryland, which is taking the lead in collecting the information, a directory of federal agency programs which support math and science. We think this will be a very helpful publication which will be distributed regionally; it will also be a database which will be accessible nationally.

One of the benefits in starting an organization like ours in the 1990s is that we can start fresh without any legacies, but one of the difficulties then is identifying the starting point. The transitions of technology are often difficult for people. I attended a retirement dinner for a library director recently. At that dinner they gathered all the technologies that that director had seen over the last thirty years starting with punched cards and ending with the advanced workstations of today. When I got to the reception line, I said "George, you must have seen a lot of changes over the years. Look at all that has happened here." And he said, "Len, I sure have seen a lot of changes and I've been opposed to every damn one of them." We don't have to make a transition from one system to another but we know that we are starting something that has to be in place for a long time. So we have to be very careful about what we put in place, and we want to

do so in a way that keeps interoperability standards and protocols paramount in what we are doing.

I am going to put up a couple of noisy diagrams, copies of which are in the handouts available to you, not so we have to look at all the details but to show you our design. I attended the first SIGWAIS which was held at USGS and came back with a number of handouts which I gave to people I work with who said "Gee, that looks just like our diagram." And that was very reassuring that we were not coming up with a design which was inconsistent with what other people were proposing. Basically, at the top is a set of clients, a MAC client, a Windows client, a terminal emulation client which will attach somehow to the Internet that will then connect to clearinghouse systems which are built around Z39.50 servers. The servers will provide access to a variety of databases, some of which may be text, image, etc.

On the side of the diagram are related databases from other database providers. The acronym we are using is CAMSED, Coalition of Automated Mathematics and Science Education Databases. The vision we have for the teacher is one-stop-shopping. You submit a search against a database and that gets translated in the WAIS metaphor across multiple databases. The ideal situation is our database or other databases know about databases that the teacher or student doesn't know about, and you get results back from places you don't know about. In other words, you find things you weren't looking for. That is the real power and utility of having interoperable systems and of having compatible formats.

If I were going to highlight one word on this diagram it would be API which stands for Application Programming Interface. That is the hooks by which you get into the proprietary side of the search engines and the database architectures. Absent that API you move into a vendor supplied and controlled situation. As we look for ways to migrate to Z39.50, we are finding that having vendors provide that API is extremely important because that is how we interface with the search or database engines that are developed with considerable expense and time by the vendors. We are optimistic that those APIs are going to be available.

I think that the important thing for me to emphasize before Nancy speaks about some of the issues that we are starting to face in implementing a Z39.50 environment is that we see ourselves as the reverse kind of clearing house. The old kind of clearing house is a hierarchy where everything is stored and which you must physically transport yourself to access and use the information. Many times when people start these kinds of activities, they think of it very hierarchically. Connect to us and we'll get you to the rest of the world. But that all falls apart when you try to start building. We really see this as a distributed network environment with a variety of information providers, a variety of services we can connect to, some of which will be commercial, others which will be generated by federal agencies, and still others by voluntary support. We see this as a way of strengthening and enriching the materials which are available for K-12 teachers

47

and students, and as a genuine experiment in delivering needed information services across national networks.

Nancy is going to speak now about some of the issues we are dealing with right now in moving toward Z39.50.

NANCY O'HANLON:

As Len said I am going to talk more specifically about the database we are building at the Eisenhower Clearinghouse. The primary database we are building is a bibliographic database or a catalog. In a way it's a mutant bibliographic database. First of all, we are going to be including all sorts of media in our catalog so that all kinds of things besides printed materials will be described. We hope to do that in a multimedia format, to present more than just print information back to the user of the catalog. One of the things that we hope to do is to provide, at least for those who have the right kinds of client software and the right kinds of workstations, linked images. Some of the kinds of images that might be useful in terms of evaluating material and deciding whether to go to the next step of acquiring are tables of contents, perhaps samples of the chapters. That gets back to the issue of dealing with the producers of the material and acquiring permission to present those images. But we do expect that there will be a lot of interest and that we'll also be dealing with some public domain information.

Some of the images would be of printed objects or pages, some of the images might be photographs because many of the materials in our collection will be objects themselves or manipulative materials that are useful for teaching math or models, different kinds of equipment and objects. While a printed description is helpful and it's needed to be able to search and retrieve that record, actually seeing a photographic image of the materials is much more useful in making a decision about it. So one of the things that we'll be looking at doing is actually providing digitized photos that would be linked to some of the catalog records wherever it seems to be most useful. Another type of image is video clips taken from those videos that seem to lend themselves to it or seem to need a little more introduction than just the printed record. And down the road we'll offer some sound files. That sort of enhancement we hope to be presenting to a large number of users.

The other kind of enhancement relates to the value of information. One of the things that we've been mandated to do as part of our contract for this project, and one of the things that makes the project most interesting, is to incorporate not only information that is already out there, what people have said in reviews and the studies educators have done to try to determine the effectiveness of the materials, but also what teachers are saying about the materials as they try to use them in their classrooms. So one of the ways this database may be mutant is that it will be interactively built by the users along with the staff of the clearinghouse. So we hope to be collecting evaluative information from users, translating that into a usable format, and linking or attaching that information to the records.

I also want to talk about the issues related to WAIS because one of the servers that we'll be making available is the WAIS server. We've experimented with the free WAIS server and are planning to bring up the WAIS, Inc., server but we haven't gotten that far in our development yet. So some of the things I'll be discussing may actually be statements or questions that we have about what the capabilities of that particular product are that when we bring it up we'll discover that we're happy with the results and anybody who has had experience out there that could help us, we'd be glad to hear about it. Some of the things that we're interested in providing in terms of content and quality, content relates to kind of information that we'd like to provide, and quality relates to the kinds of searches that we allow users to do and also to the kind of results that they get back.

For the bibliographic part of the database, we think that the Boolean and literal phrase search features and the ability to do truncation within the WAIS environment are very helpful. The hyper-search kind of capability which allows you to find an item and run that against the database and find other items like it is certainly a feature that we like a lot.

Other things that we are looking for and are not sure yet how they are going to play out in our own development are fielded search because the records are structured and because it may not be useful for a teacher who is looking for materials for fifth graders to run a search for the word "fifth" and get back records with the addresses of publishers on Fifth Avenue, and we've all had that kind of experience in our own searching. So we think that the ability to be able to run a search against specific fields is an important one and that it helps to provide a better quality product. The other thing that we're really interested in doing is being able to display entries from our thesaurus, our controlled vocabulary, in order to enable the teacher or user to do a better search, to not have to guess about the terminology that is in the database but to be able to see representations of what the terms are. Again, it's not clear at this point what the capabilities of WAIS will be in this regard, but this is certainly a feature that we'll be looking for.

My last transparency has to do with the quality of searches and navigation issues. Because we will be providing access to other databases besides our catalog through the client or the user interfaces that we provide, we have to exercise some control at that level even though it is an open system, in terms of collection development and what databases we make available and how relevant they are to our user community. Beyond that though, there will still be problems related to consistency that I think we are just starting to be aware of both in terms of the kind of data that are contained in the database and certainly the vocabulary and the indexing structures. In some ways WAIS provides a nice leveling facility in that you are not coping with lots of different kinds of database search engines so there's a predictability in terms of the response and I think that's one of the attractive features related to trying to bring up a group of databases together.

We are looking to Z39.50 to help us in terms of attributes and identifying fields in a fielded search kind of environment that may have disparate labels. The bottom line is that the producers of the database may have employed different terminology despite our best efforts to try to work together to use a common vocabulary. In order to provide a quality search, we need to find a way to overcome those disparities. One of the issues we're looking at is the issue of a meta-thesaurus since we would have presumably a little more control and knowledge about the databases that we would provide access to through the clearinghouse. At some level we think that we may be able to do some tinkering in order to improve the consistency of search results that come back to users by doing mapping of vocabulary. Again, we'll be looking to see what kind of support there might be within the WAIS environment for us to do that.

I think I may have posed more questions than given answers at this point. I hope that the next time that we come back to talk to you we'll actually have something to show you and maybe some answers.

NETSURFING - SHOOTING THE CURL

Wayne Allen
EINET

I work for EINET in Austin, Texas, which is part of MCC. First, let me tell you a little bit about what EINET is and what we do. EINET stands for Enterprise Integration Network. We provide secure client server applications, secure communications, commercial transaction support, virtual private network support, and, more relative to this gathering, network information navigation.

We've been looking at the navigation problem very seriously because we feel that is one of our most important value-added elements to our network services. Our customers tell us, and we concur, that navigation of information on the network, particularly the Internet information that's freely available, has to really be easy. So what we're doing is trying to adopt a role-based navigation in which users play roles, very much like when they assume their work role of doctor or lawyer, or a role assumed just for fun. But these roles are flexible. A user has to be able to change roles, as a manager at one point and some other kind of role at another. You need to be able to customize roles, and the data that the user sees should change depending on what role he adopts. The reason that we do this is that our main target is the commercial world, and most of the commercial world is still standing on the beach. You don't have to teach them how to be expert surfers or how to shoot the curl, you just have to get them into the water. Easy navigation is the way to do that. We think that the surfer down inside them will take over after -- that is our theory.

So the kind of information we need to provide for them, and what we are looking at initially, is the information available over the Internet. It comes in many different forms. There's raw data available through traditional, older means such as FTP and Gopher. Then there is more structured data which actually provides some mechanism for searching such as Veronica which is a way of searching Gopher space, World-Wide Web, X.500, WAIS, Archie, whois, and a number of others.

Then there's information about information. Some good examples that you can find in the Web if you want to see some interesting databases is the UUNNA Meta-Library at MIT, World-Wide Virtual Library at CERN, O'Reilly and Associates has something called "The Whole Internet Resource Catalog" which is very interesting, and the Library of Congress, although I'm not sure you can classify this as meta-information, has just built a Gopher server called LC MARVEL which you should look at as it really is quite a marvel.

So in order to provide role-based navigation, which we are really just starting to look at, we have to identify both raw meta-information on the network and we have to

create role-based search spaces so that the navigation can proceed without the confusion of semantic heterogeneity among the lexicon of the database. In other words, if you have a database that's all about baseball, then when you ask about Babe Ruth, you're not going to get confused by the answers that you get. But to just index and search through raw data from the Internet is practically worthless.

So this is what I mean about searching across protocols. Protocols are typically boundaries of search spaces right now. If I want to find something about forestry, I go to the Gopher search space and I look in the Gopher world. Then I go to WAIS and look in the WAIS world. Then I go elsewhere and search that world. We don't want to be that difficult to deal with. We want to just look for forestry, and find information about it regardless of which access protocol space it's in.

Lastly, as a network provider, we don't want to bring all this information into our site to give to people when they find it. Therefore, we have to deal mainly with references to information.

I don't know how to describe this slide because we're not very certain of this ourselves. This gives a general picture of how we're going to proceed in our experiment. I've built an experimental WAIS server and indexer that understands uniform resource locators (URLs) which, as been explained earlier this morning, is the means to span protocols through the address of a piece of information or a service or a document. Basically we're going to build raw WAIS databases from the various protocol access spaces such as the Gopher databases, World-Wide Web databases, and so forth. And then we are going to extract these URLs using some standard taxonomy or categorization mechanism from these raw databases, identifying the documents which belong in each topic or category, regardless of where they live and through which protocol they are accessed. Then we are going to integrate more meta-information sources in with that, the raw data, and create topical rule-based databases which are WAIS searchable and will return references to remote information.

We now know a little more about how we are going to deliver this information because people are going to be looking for this information through a variety of means. Obviously, we are going to provide WAIS clients. We are making WAIS clients for the MAC and PC available toward the end of this month as shareware. When you access information with a WAIS client, typically a user will get the document that he asked for because the WAIS server will gateway, get that document through whatever protocol it is accessed by, and return it via Z39.50. That makes most of the world of the other protocols available to simple WAIS client users. For example, if what is referenced in the database is a Gopher menu, what the server will do is turn that into a WAIS catalog which WAIS clients know to look at and let you select from. Then there are cases where what is found is actually a service, a telnet interactive service, for example. In this case, the server will return a types document containing the URL so the client can launch the appropriate application to use the service.

52

For Gopher clients, the user will basically see what any Gopher client would see, a Gopher item list. The same is true for Wold-Wide Web clients.

The peculiarity of this database is that it will have nothing to do with the clients per se. The database is going to be smart in how it finds and returns data to users.

This is a very difficult undertaking for a number of reasons. One is the immense amount of raw data out there. There are over 1,400,000 entries in Gopher space, only some small portion of which are Gopher menus. Most of those entries are references to real data. To even index the titles of the menus is an immense chore, which is what a Veronica index is. The amount of space in X.500 is immense. We have an X.500 walker which goes out and finds things in X.500. We WAIS index it and throw the data away because we can't afford to keep it all. The problem is that we need to organize as a community to find ways of making meta-information, information about the raw data, available so that navigation services can be provided to find the data. There is no way the current protocols can support that. The new WAIS protocol, for example, has a feature that allows you to inquire about the nature of the database itself. That is needed in all of the different protocols.

If you are interested in talking to me further about this or in helping with it, send mail to me. For more general information About EINET, send a message to EINET-INFO@EINET.NET. For information about EINET's WAIS clients, send a message to WAIS-TALK@EINET.NET.

AN INTELLIGENT WAIS INTERFACE

Lucian Russell
Director, Advanced Computer Applications Center
Argonne National Laboratory

SLIDE 1: Advanced Applications for Saving Time and Money

* Argonne National Laboratory believes that new technology (e.g. Cooperative Answering) can provide this enhancement to WAIS.

* New public domain technology can be used to incorporate Thesauri into search engines without spending $50,000/copy for software.

* Argonne believes that by carefully exploiting public domain technology from Universities, the benefits of advanced Information Retrieval can be provided to government agencies TODAY.

SLIDE 2: An Intelligent WAIS Interface Project: Overview

* Extend the WAIS Client that assists the user in retrieving documents from the server (add new terms).

* Define for the WAIS Server how to identify relevant documents (increase precision).

* Help minimize UNNECESSARY TRANSFER of irrelevant data across the Internet.

SLIDE 3: Future Headlines?

* "Danger: WAIS falls victim to its own success!"

* "The Information Highway a Victim of Government WAISte!"

* "User WAISting away, waiting for data"

* "The Future of WAIS: Waiting for KNOWBOT"

SLIDE 4: The WAIS Architecture: Public Domain Version Beta Release

```
                          .-------------------.
Client -/-/-/-/-/-/-/- | -Z39.50 Protocol  |
           Internet      |  Converter        |
                         |        |            |              Relevant
                         |      Search   <----|----> Documents
                         |                    |
                         | _____Engine_____|              ^
                         .-------------------.               |
                               Server              Keyword Table
```
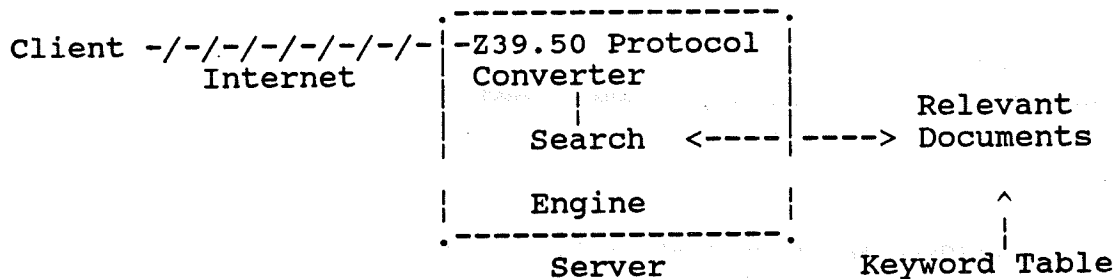
SLIDE 5: WAIS Directory: Locates WAIS Servers via Internet

* Locates WAIS servers that claim to have relevant files/information.

* Relevance Feedback a function of the Server's "Intelligence".

* Current "Public Domain" server ranks "relevance" by a count of keywords.

* Nobody judges adequacy of servers, either content or relevance ranking.

SLIDE 6: WAIS can be used for:

* Finding repositories of files containing relevant information.

* Filtering documents (files) based upon a user profile.

* Transmitting relevant documents to the local database (Client) for later perusal and use.

* Avoiding excess work *and* cost!

SLIDE 7: The WAIS Dilemma: Precision vs. Recall

* Favoring Precision: a customized preprocessor to the Client can potentially improve precision of retrieved documents.

* Benefit: the Client can sort and sift and analyze at the user's leisure.

* Drawbacks:
    -- excessive traffic due to unneeded files being shipped around the world.
    -- extra cost from servers with access charges

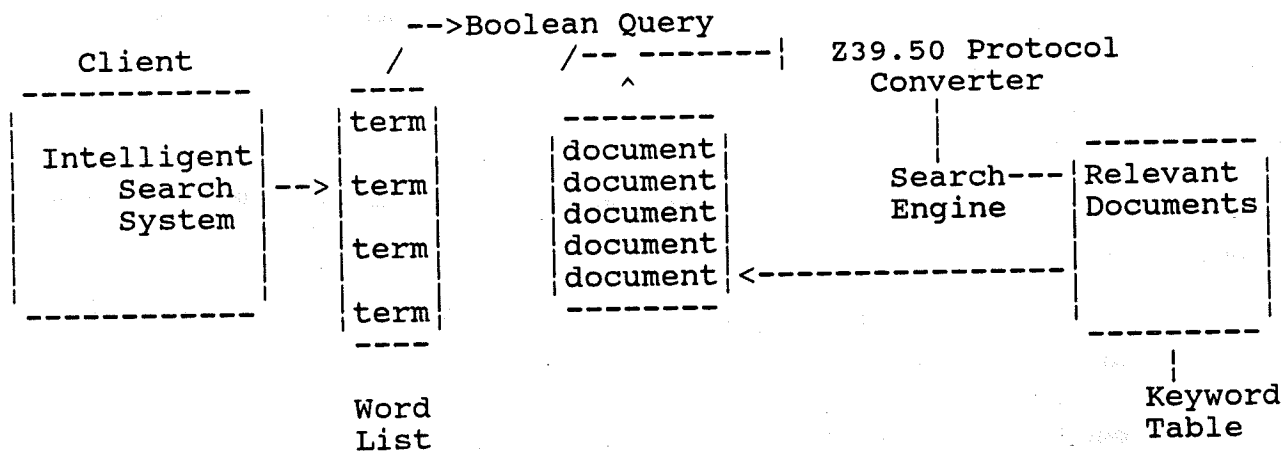* We would be better off with greater precision at the WAIS server.

SLIDE 8: The WAIS dilemma: Client or Server based "Intelligence"

* Clients may retrieve documents using one or more search methods:
    -- Boolean
    -- statistical relevance
    -- thesaurus-based

* Benefits: full capability of commercial products are available.

* Drawback: High costs (e.g. $50,000) of client software discourages use.

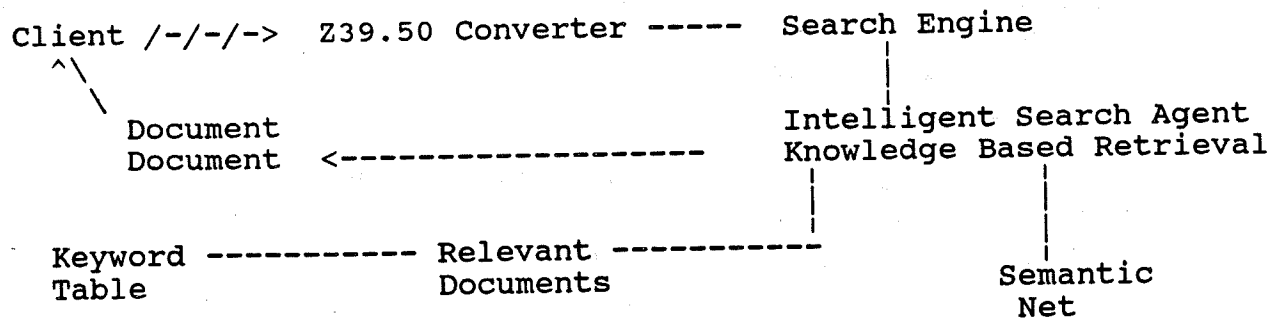**SLIDE 9: Project Goals for the Intelligent WAIS (IWAIS) Interface**

* Investigate the effectiveness of merging intelligent database technology with other areas of information technology to better control the precision of access to WAIS documents.
* Determine what types of intelligent processing can be performed on the client.

* Determine what types of intelligent processing can be performed on the server.

SLIDE 10: The WAIS Architecture: IWAIS Client

```
                        -->Boolean Query
   Client              /              /-- -------|   Z39.50 Protocol
   -----------       ----           ^            |      Converter
  |           |     |term|        --------       |
  |Intelligent|     |    |       |document|      |
  |   Search  |-->  |term|       |document|    Search---|Relevant   |
  |   System  |     |    |       |document|    Engine   |Documents  |
  |           |     |term|       |document|             |           |
  |           |     |    |       |document|<------------|           |
   -----------      |term|        --------                          |
                     ----                                 ---------
                                                              |
                    Word                                   Keyword
                    List                                    Table
```

57

SLIDE 11: The WAIS Architecture: IWAIS Server

```
Client /-/-/->  Z39.50 Converter -----  Search Engine
    ^\                                         |
      \                                        |
       \   Document                    Intelligent Search Agent
           Document  <------------------  Knowledge Based Retrieval
                                                |              |
                                                |              |
    Keyword ----------- Relevant ----------     |
    Table               Documents                      Semantic
                                                         Net
```

SLIDE 12: The IWAIS Interface: Project Environment

* The CARMIN system: a logic program implementing cooperative answering techniques for enhancing query processing in deductive databases.

* An initial semantic net: The Environment, Safety and Health (ES&H) Thesaurus developed by the DOE Office of Scientific and Technical Information (OSTI) becomes part of a deductive database.

* ES&H documents from the DOE developed for the Facility Profile Information Management System (FPIMS).

SLIDE 13: Project Plan

* Build a semantic net from the OSTI Thesaurus (broader terms, narrower terms, related terms).

* AUGMENT THE SEMANTIC NET WITH ADDITIONAL PREDICATES AND FACTS.

* Generate a logic model from the semantic net.

* Perform a precision/recall comparison test with and without the cooperative answering preprocessing of queries.

SLIDE 14: Program Auspices: Division of Educational Programs (DEP)

* The Department of Energy has special programs for college students to obtain research experience.

* The Advanced Computer Applications Center (ACAC) selected two students to participate in the IWAIS evaluation this summer.

* DEP pays for the students' participation.

* Guidance is given on an as-needed basis by specialists in logic programming.

SLIDE 15: Hypothesis under Test

* Using Cooperative Answering will improve precision/recall: more appropriate documents will be retrieved.

* Conventional methods fail to find all relevant documents, so additional methods are needed to give more meaning to searches.

* Adding knowledge about the real world in the form of additional predicates (assertions about facts and relationships) augment concept based searching and retrieving.

SLIDE 16: Thesaurus methods provide only a start!

* Knowing that the "Department of Energy's Secretary" is a "Cabinet Officer" doesn't help you find that the Secretary's name is "Hazel O'Leary."

* Knowing that Argonne National Laboratory is geographically "nearer" to Oak Ridge National Laboratory than Brookhaven National Laboratory (USGS WAIS Server information) will not tell you that Argonne and Brookhaven "report to" the DOE field office in Chicago whereas Oak Ridge does not.

SLIDE 17: Generating Cooperative Answers to Queries

* Improve human-computer interaction through collaboration

* Interpret queries based upon user expectations, desires, and interests

* Detect and correct misconceptions in user queries

* Present answers to queries such that they are understandable by the user

SLIDE 18: Relaxation Technique

* Experimenting with relaxation technique used in the CARMIN system (prototype cooperative answering interface)

* Work interactively with the user to find alternative answers related to the answers of the original query

* Use taxonomy clauses to relax predicates, constants, and variable dependencies in the query to expand the query's search space

SLIDE 19: Example

* User: Which DOE sites have material science departments.

* Relaxation steps:

--(1) split query into key terms (e.g. DOE site, material, science, department)

--(2) ask user if he/she wants to relax any of the terms, for example, "DOE site"

SLIDE 20: Example (continued)

--(3) generate query template for each term in (2) from taxonomy (e.g. a taxonomy based upon domain-specific thesaurus)
specialization: "national laboratory"
generalization: "site"
synonym: "location"

--(4) pass query template (i.e., modified query) to retrieval or database system (e.g., WAIS)

SLIDE 21: Original Experiment Evaluation

* Compare documents retrieval by WAIS server & their relevance ranking: Boolean searches before and after additional terms are added.

* Problem: public domain SUN server WAIS does not support Boolean search.

* Problem: public domain SUN server WAIS only uses single keyword count as a "relevance" ranking criterion.

SLIDE 22: Current Evaluation Plan

* Obtain additional terms from IWAIS using the Cooperative Answering Technique.

* Construct Boolean queries using new terms

* Perform search in the Facilities Profile Information Management System using the "Personal Librarian" Information Retrieval tool.

* Evaluate precision recall differences with two methods, Boolean search and Conceptual search (statistical methods).

SLIDE 23: WAIS Server Conjecture

* Separate databases of Thesauri terms AND databases of facts and knowledge (predicates) could be stored on a per-user basis.

* Alternative relevance ranking criteria could be considered as independent "dimensions" for ranking:

-- Statistical measure
-- Thesauri enhanced measures
-- Fact/predicate database measures

SLIDE 24: Conclusion

* Haste in implementing servers will make for a WAIS-full use of network resources.

* Maximizing relevance criteria options for servers is a necessity.

* Providing an intelligent means to merge data from subject- matter databases with thesauri will increase search and retrieval capabilities beyond those provided by language based tools.

61

USE OF WAIS FOR DATABASE ANALYSIS

David Icove
Federal Bureau of Investigation

My name is David Icove, I'm program manager at the FBI's National Center for the Analysis of Violent Crime. That's located in Quantico, Virginia, that's at our FBI training academy facility. If you saw the movie the "Silence of the Lambs", my hallway was where it was filmed so, some of the computer equipment that they featured in the film, I was in the process of surplusing it, but had I known that I would have given it to them -- but I want to thank the Library of Congress as well as the other WAIS participants, as well as my friends at the U.S. Geological Survey that have helped us along just recently in the new endeavor we call "Project Matchup." USGS provided us their version that has provided us with some untold results which this is the first form of its kind in the public sector which we are going to be able to brag about it.

My objective today is to give a very short talk but complete for you but basically I want to tell you about two things or three things right now as far as the existence of the National Center for Analysis of Violent crime -- we call it the "National Center" -- as a member of the WAIS community; don't look on the Internet for "FBI.gov"; you are not going to find us but we are there; but we are there in a private network.

We are also using the WAIS technology to not only search for information but also to match together what we consider to be vary sparse databases. And the types of crimes that we look at are unsolved violent crimes that occur throughout the United States.

The third thing is that I wanted to at least address a few items with you as far as our research and development efforts that we perceived to be important in the future.

To give you a little background, the National Center is basically a fusion center, it's an all-source collection center for all information about violent crimes that occur within the United States. And the types of violent crimes we look at are those done by serial offenders, that is offenders that use jurisdictional boundaries to their advantage to evade detection from law enforcement. We also provide advanced training to Federal, State, local and foreign law enforcement officers in the area of using advanced technology for solving crimes internationally. And we also do our own research and development. If you sort of take a look at it, the National Center basically is like a mini-laboratory facility. We're presented with real life problems, we address them, we take a look at them and in cases, have to go out to find the technology to solve very realistic crime problems, very accurately portrayed, and like I said before the USGS provided us at least with the "intro" and their experience in helping us with this problem.

We also have found in recent audits of our own information that the existing crime analysis technologies that we had were inferior and that they did not provide the results that we wanted. They failed basically to extract a lot of the information that we had about our offenders and needed to support our investigations, and the bottom line is, at least based on my evaluation and contractors that have taken a look at what we are doing, that the Z39.50-WAIS standard appears to be the way of the future for crime solving.

Like I mentioned before our basic problem is in looking at serial offenders that use jurisdictional boundaries. We have problems and if you see some of the popular literature and read some of the newspapers on a daily basis you are going to see that serial violent offenders are both something of the past but will be a part our future. They use jurisdictional boundaries, they use the facts that they can evade detection from law enforcement by crossing boundaries and going from one jurisdiction to another, and what they do is prevent law enforcement [agencies] from talking to one another as well as sharing these facts and cross referencing the information. And to take a look at what we used to call the modus operandi, the MO of the offense, we look at it as "crime signatures". The basis for this is that we needed good techniques to extract not only the method of operation but also these signatures from the databases and the databases that we had are definitely very sparse.

On the tests that we conducted, these were the data sources that we looked at, I felt like a cook, I threw a little Associated Press wire service "traffic" in there, we have a foreign broadcast information service which tells us what's going on world wide, VICAP is our unsolved homicide database. Those are unsolved homicides that come in to us throughout the country by law enforcement agencies that said "Hey, we can't solve this homicide or this group of homicides. It must have been done by an offender who has left and fled our jurisdiction and moved to another one, so what can you do to try to match that case with all the other cases you (the FBI) may have had reported to us." We also have the National Firearms Reporting System. The program that I manage is the Arson and Bombing Investigative Services. We look at all arson and bombing cases throughout the United States. We get a 100,000 arsons and bombings a year, within the U.S. it's just an amazing total, 85% of those cases are not solved. So, we have about 85,000, of those, about 25,000 of those are motor vehicle fires. So we have a sparse database there but we have a lot to do and anytime you see a good major serial arson or bombing case we've got it. We are always constantly massaging these databases to try to determine has this event happened in the past. We also have bomb incident reports that come from our bomb data center and we have a fire incident reporting and we have National Incident Base reporting and then what we have called NCIC "bolof" messages, "Be On the Lookout For" messages and these seem to be the sparsest of all the databases we have and what I call, basically "messages in the bottle".

I used to work for a police department and what happened was when you couldn't solve a case, what you did was you went down to the NCIC Center that we had and you wrote a little message, and it said: "Some fellow was in our jurisdiction and he has done this, this and this and he is no longer here and if anybody has any crimes similar to it please let us know." And we would send it out, hoping that somebody else would read it. And I would go down every day and read the messages that came out from other agencies and then, say well I may have it and one day I picked up a message, and we just had a case like this, and I went back down to take a look at the clip board and the message was gone. And the NCIC clerk said, "Hey, if you didn't keep a copy of it, it's gone." So what we have been doing is archiving these messages.

So based on that, we went to the next step. We went to our users and said (there are three programs that we have down there, arson and bombing, unsolved homicides and we have people who do basic criminal investigative analysis on general crimes and I said) to them, "What do you want? (And these people are not computer literate.) So they said: "We don't want any slick and shallow software". They were intuitive, weren't they. They had limited computer skills, they wanted to be able to access multiple databases at a single stroke. They said: "We don't want to have to go in and in and hit and hit different databases." (Which is what was going on.) (And you can see the picture getting closer and closer to the WAIS solution here.) They wanted intuitive user interfaces and they also wanted to search and match similar cases.

In the FBI we have a great deal of time spent indexing information. We can look up anything. If we found a stolen typewriter: "Yup, we can find it; Yup, this is where it was stolen from", and MCIC had it or we had it in one of our files. But if you went back and said "alright, we have had a series of bombings over the last 10 years and this has been the MO, this is the target, this is the "victimology", this is the damage that was done and this is the area of the country that we want to concentrate in," we had no way of going back to these databases and saying: "Given this constraint, given this relevance feedback, tell us similar cases just like this." So this is the impetus of why we started "Project Match-up".

We wanted national standards, I went to our procurement people and especially our computer people, our IRM folks, and they said, "Hey, we don't want you doing anything unless it has the word 'GOSIP' next to it." All the open standards and everything else and I said "OK, you're the boss," and so I went back and said "I think that these might adhere" and we wanted to have a Client-Server relationship.

So here are some results: Right off the bat, we went out and got from USGS a couple of versions of WAIS and finally we settled on theirs because we liked the clean interface as well as the boolean logic; put some simple queries in there and got some simple answers: we put cases in there that we knew matched and we got back, matches, but what really bothered me: we were getting back matches on other cases that we were unaware of. The known cases that were matching matched very closely; new information

received on active cases; the relevance feedback scores were very high, in a lot of the cases, and we were able to see that once they fell off, exactly where the cut points were. We also structured our databases; basically we "tokenized" a lot of the information that we put in and we were able to fool the system to do much better; so we learned a lot and we have some other text retrieval projects at the National Center that we oversee to look at "Concept-Based Reasoning". We would look at legal reasoning, we look at concepts that would understand who the President of the United States might be. And we applied that logic, appended those concepts to the end of some of the messages that we had and threw that back through WAIS. And it increased its useability that much higher. So a large fraction of the text we saw was really going unseen.

To give you some statistics on what was going on. We took our unsolved homicide database which basically we had over 200 linkages, 200 sets of known serial cases and on the average there were 4 homicides for each of the case of the 200 some cases, ran it through and we looked and we said all right let's try it out. So we started and the analyst said, "Oh no, you're cheating because the same police officer filled out some of the same reports", so we said fine those are intra-state reports, we'll do the inter-state, which basically represented two or more states in the different reports so unless a police officer quit one department and went to go work for another one and filled out the same report, the intra-rated-reliability issue was pretty well washed away. From those, 77% of the cases we were able to match back to there original pool of known cases. The only reason that the 77% wasn't higher was there were new cases coming in that they were unaware of altogether and that was pushing the known matches down into a lower relevance scores. If we added the intra-state cases, we would push it past 90%. So these are definitely interesting aspects that we have seen.

As far as the future aspects at the National Center, we definitely see that there is going to be more effective use of computer technology, information technology in some of the areas. We already have departments coming to us saying "Hey, we have these large sources of textual information in our databases as well as geographically based information, what's the next step, what should we do?" And they are asking the same questions we are: we don't care, we don't want to look up similar cases, we want to match similar cases based on MO. So the other thing WAIS fits the bill on, is the fact that we can pass that technology on to another agency and we are not barred from the normal issues of keeping it within Federal government, we can extend out to state, local as well as foreign law enforcement agencies. And that's our true mission at the center, basically, sharing and retrieving technology as well as investigative skills, to help us out. So if it's an efficiency-in-government issue, its a TQM, we're not quite sure what it is, but basically we meet the quidelines as far as enforcement response and cooperation. We definitely intend to do further cooperative research with our friends at USGS as well as DOE and some of the other Federal and local agencies in striving to enhance the concept of what's being applied. And I know that a lot people were surprised when I first let them know that we were actually applying this technology to solving crimes even internally within the FBI and they said, "What! We've never even heard of this. And

what are you doing?" So I said, "Well, it's only two years old so we wouldn't expect you to know too much."

We are also looking for implementations of images and multi-media. A lot of the information we have especially with the retention plan of the National Center, being a fusion center, we are like a Library of Congress, but for violent crime. And, our retention period is 50 years or the life of the program. So our records-management people ask me at one time do you think you will need more than 50 years retention period and I said, "Well, call me back then and I will let you know."

But images are a great deal of the information we have, because we can tell alot from a crime scene and it's vary laborious to go back, and say , "You know, I got a case just like that in the past", and go try to find the aging photographs, the yellowing documents that we have so, as far as wide area information servers, we would almost want to consider wide area information sharing because of the ability for us to quickly retrieve and access the information that we have. And basically, also, the handling as far as databases which we have to realize, as far as our mission is concerned, basically the "buck stops here". The National Center was established basically to handle the cases that were cast off by law enforcement. The cases that can't be solved and basically what we are showing is that technology like WAIS, when it's applied correctly, can take low solvability information, sparse databases and actually solve cases using the technology. So in conclusion, I thought that this quote would fit well that, "We are drowning in information, but we are starved for knowledge," from my favorite book.

Any questions?

QUESTION 1: A question on recidivism, you may have cases which are closed on persons caught and apprehended -- who go to jail for some time but then come out and resume -- so you have a case there where the case is closed, might be archived, but of use, and ought to be tied in when certain offenders are released.

ANSWER 1: That's a good question regarding recidivism. We do a lot of things about recidivism, one is that, we go out and interview the experts are not the investigators but the actual criminals themselves, so we go to the prison systems and seek out the people most likely to exercise recidivism and actually do full interviews and we ask them questions like nobody ever asked before, like, "How did you get caught?", "Why did you get caught?" and "Would you ever do this again?" as well as a lot of research protocol issues and when I said we are basically like an R&D corporation, that's one step ahead. So for example, from a person who we interview or a case we worked historically in the past or cases that are submitted by multiple agencies that don't realize that we are looking at the same offender. We have seen those types of instances in the past so the issue of recidivism is very near and dear to our hearts. I haven't proved yet whether or not there is a good predictor for repeat human behavior and in the future -- once an offender gets out of jail or one of there cases are resolved. That's a good question. Thank you.

QUESTION 2: [inaudible]

ANSWER 2: We are just taking the data and placing it in flat file format, directly in, we've exploited every technique that you can use in WAIS. What, we have done is "pre-iconized" the information. For example, a location is also blended into its item number, location and name itself so when WAIS indexes it, it just looks like a token, so we have been able to force it to be more accurate than it has been in the past. We just place it in a flat file and I have these contests: the National Center is in a basement. (We sometimes call it the "National Cellar".) We are trying to see how large a database we can force through WAIS, before it collapses. And at the last database that I picked up, I thought was going to be the largest, we had 11,000 incidents of bombings and then I went through another incident database of interviews and we indexed about a 150000 interviews in the database and it responded just as well as my little 11,000 item database for the bombing incidents or 5000 for something else, so we had not been able to "collapse" the system. We end up with some very large indices but the system works fine and we are very happy. As I said we are very happy to be a member of the community, too, because we get a lot of the information just from some of these forums.

QUESTION 2: [continued, inaudible]

ANSWER 2: [continued]. I have no memory size problems we are using an old, antiquated VAX and it seems to be coming along just fine. We've also started using it on a DEC workstation and a SUN platform, in comparing and contrasting the speed, but time is relevant when you work in a basement and I just set it and let it index over the weekend and when I come back, on Monday morning, it's there.

QUESTION 3: [inaudible]

ANSWER 3: This is still an experiment. What we have done is to show that we can match our existing cases. To put this in a timeframe, we're talking less than 3 months from the time we received the software from USGS to this date that we have been using the technology and like I said we have already we've already had outside agencies come in to take a look at it, we've had contractors come in and look at what we are doing, and saying, "We don't know why you are doing so well" and I say "Neither do I but I'm keeping my fingers crossed." But, I'm sure that, I saw that little novel newsletter about the WAIS clips in the front, there, and I'm sure that I'll be more than glad to send you the results of from our first case when we get some positive feedback.

Other than that, I want to thank you very much, I'm going to be around a little later on, if anybody has any questions that they want to ask that's fine. Thank you very much.

DowVision

Greg Gerdy
Assistant Director of DowVision Services
Dow Jones & Co., Inc.

Good afternoon. I hope everybody's holding up OK?

I had a little bit of apprehension coming in, I know that Dow Jones is a big fan of WAIS, big fan of the Internet, and probably a year ago, they may not have asked anybody from a commercial firm like Dow Jones to speak here. But in fact there are some historical reasons why you might have, anyway at that time, and, over the course of the past year, things have started to open up for the commercial world.

But I wanted to share a couple of stories that relate to Brewster Kahle, Dow Jones, Apple and Peat Marwick and Thinking Machines, because I've been in the lucky position to be both the product manager of ongoing products but also had some kind of responsibility for new business development, or new product development. I've been able to see WAIS both as a slice in time of what's in the market, and also what's coming.

Let me give you an example. We have had DowQuest available since 1988, and, of course, I've been able to see user reactions -- I'm a user myself -- I'm a big fan of it for half of my searching, the other half I use our full text database. But for half of my searches, and fuzzy kind of searching, it's fantastic. But also around the same time, we started up with a couple of different flavors. First of all our executive VP, at the time, Bill Dunn, had set up a little skunk works, in his office, using WAIS connected back to this static database, I don't think it was DowQuest, but it simulated a live session where the only pointers running from his Mac down to our system downstairs, and it was sort of saying,"this is really going somewhere." And he would bring people in and out of his office showing people where this was going. And then we had the project with Apple, Thinking Machines, KPMG which although it didn't totally come together as a packaged product, all the separate elements went their own way and are becoming things: we are off on our own on DowVision, which I will talk about in a second, KPMG has become a big Mac user and is evaluating DowVision, Apple went on and did some things with the reporter software and, of course, Brewster went out and formed a company. It's all kind of exciting, it didn't come together as you might have envisioned in those first meetings.

Anyway, I was asked to talk about DowVision, today, and I will do that, but I hope at some gathering in the future I have a chance to talk a little bit more about it as it relates to the new WAIS.

Anyway, DowVision is a commercial service from Dow Jones that's been available for a couple of years now. It's a fully integrated information service that combines components of broadcast delivery of real-time news and of interactive retrieval back to our host services, specifically Dow Jones News Retrieval. It runs over a proprietary X.25 network and is assembled at the customer site by Alliance Developer software that provides a client-server solution for the customer.

Taking a look at a schematic, the most exciting thing for me, being part of this, is that you start with the world wide news gathering of Dow Jones, where reporters are out there filing stories, and literally, electronically it moves all the way through the system right to the profile on your desktop. So in a sense you have 900 Dow Jones reporters, AP reporters, with whom we have a joint relationship and all the other people contributing these new sources getting directly to your desktop essentially in real time. So it's an exciting concept having them all work for you.

To give you an idea of the sources that are available, it starts with "The Wall Street Journal" delivered every day at 2am, same day delivery, and since we allow you to store it for up to six months, this becomes a pretty important archive for business people who often have a shorter time frame as far as information requirements. But it also contains a range of business and financial news not only from Dow Jones but third party sources, such as PR News Wire and Business Wire.

I think that one of the most important things about it is that it is integrated into the way that you work. The lesson I got from what Bill Dunn had demonstrated, using WAIS technology a number of years ago, was that the system worked well in his desktop environment. And, in fact, we work with third party developers who solve problems for a wide range of platforms, operating systems, hardware, network environments -- it's pretty well covered.

For the commercial user we broke down another barrier, in that the information is priced on a flat-fee basis so, now, you can actually budget for it. Many of you are used to using Internet and WAIS for information that you don't necessarily pay for -- although you always pay for it, one way or another --but the biggest obstacle in the commercial market has been, "I can't predict how much this is going to cost me, get me a flat-fee price", so we have done that and it's proved to be very popular.

The other thing we've learned is nobody in the commercial market is sitting around waiting for real-time news to come to their desk like in the securities industry. However, we've already been able to attract the wide range of job functions that you see listed here and a slide I don't have here, a wide range of industries, everything from pharmaceuticals, to high tech, to public relations, to oil and gas firms, energy firms. We are already seeing the interest in this kind of delivery system mirror the kinds of use that you would see in a Dow Jones News/ Retrieval or some of the other services, like Dialog and NEXIS.

In fact I would just like to share a few war stories because, some of them are very good, there are others, even more, that I am not going to mention. And we feel good that we have proved that the concept works. Much like WAIS is coming along and proving that information retrieval across a wide spectrum can work, if the software is good, much the same we feel that the concept of delivering into the corporate market is starting to prove itself out. For example there's a company, in New Jersey, a public utility company, where they had people literally sitting there, flipping through papers, clipping articles, putting it into this huge stack, and circulating it around the company. Well somebody said that, "this is nuts, why are we doing this?!?" So they brought the system in, and now all their executives are receiving DowVision on their desktop. It's been great for us, of course, penetrating the corporation and getting our news on people's desks. The problem is the other half of the company was described by their representatives as being "out of Jurassic Park", so we're never going to reach those people, because they never look at computers. But that's OK.

We also have mixed environments; there's a very, very large software company where the executives get the full blown system and the other people in the organization -- a couple thousand of them -- get E-mail delivery of the news.

We also have -- this is my favorite story because I heard it first person -- there's a group that we're working with that has DowVision on a firm wide basis, and they saw a piece of news come in, three or four o'clock on a Friday afternoon, that one of their subsidiaries on the West coast was in trouble. They put together a "SWAT team" and went out over the weekend and by Monday they had saved the business. So a system like this is going to pay for itself with one incident like that. But what we're really trying to do -- and I don't have to tell any of you this because you are in the field, but if you can get people and users to develop a regular habit of keeping up with their news, their business news, in this case, they're going to be better informed and better able to deal with the competitive environment.

And just one other measure, then, of how we're doing for those of you who might have heard about what we're doing, as I said, we've been available commercially, two years now, we have over 100 customers, our user count is getting close to about 30,000, that's registered users, and it's growing at a nice pace.

Finally, I think -- I don't have to tell any of you this -- but it is something that we are trying to get our customers to understand: that to really operate in the nineties, the external information that you need to know is becoming much more important in running your business, because the cycle times are shorter and on and on -- you have heard all the reasons -- and we are now trying to starting to build up some good evidence that in the corporate market, a solution, like the one that we have, is very critical to that.

Specifically, what comes beyond this, our interactive connection back to Dow Jones News/Retrieval and DowQuest, is nearly completed; our development is done, some of our Alliance Developers, people like Desktop Data and Verity, some of them, will be coming along with solutions to tie back into our host service. One of the things that gets raised in discussing the issue of WAIS is, well "Where will Dow Jones go with this?" Well, number one, we know the technology very well and we are very impressed with it. Number two, having a host service with over fourteen hundred text publications, we're always interested in what the latest retrieval technologies might be. Third, having set up our own network and looking at other ways to distribute information, the Internet itself is very attractive. So with that in mind, you can imagine -- although I can't say much more than that -- we are looking at this very closely because it's a very important collection of technologies that we would like to see come together and help our customer base as well as attract new customers.

Anyway, thanks for the opportunity to present today and I would hope again some time in the future, we might have even more to say.

Any questions?

QUESTION 1: inaudible.

ANSWER 1: Our systems development group is looking closely at Z39.50. I don't have anything specific that I can talk about today, but as I said, in the context of my earlier comments, we're watching it very closely, because we know it's important. Thank you.

APPENDIX A: SELECTED LEGISLATION IN THE 103RD CONGRESS RELATED
TO ELECTRONIC INFORMATION DELIVERY

compiled by
Allene Farmer Hayes
Congressional Research Services
Library of Congress
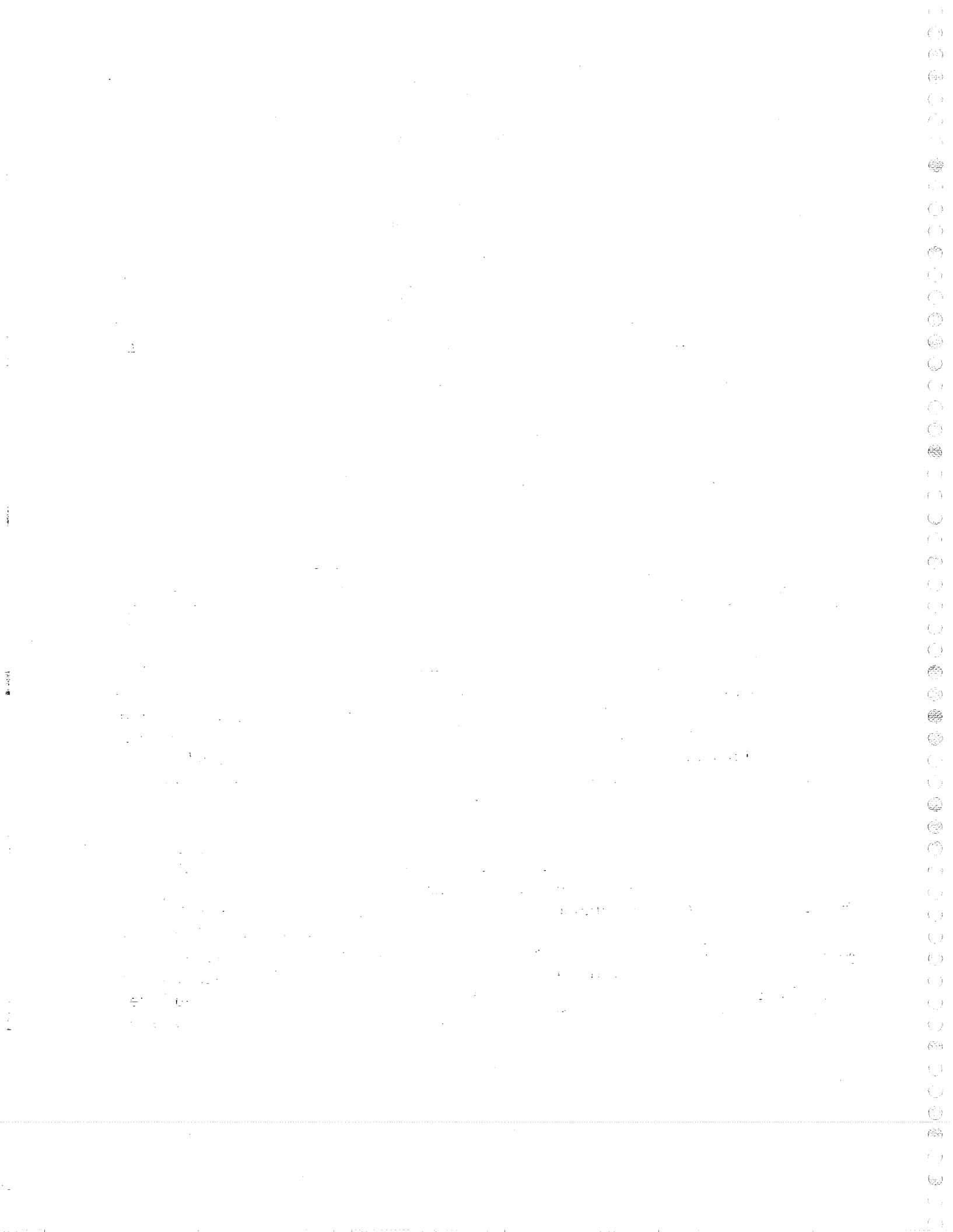
73

SELECTED LEGISLATION IN THE 103RD CONGRESS RELATED TO ELECTRONIC INFORMATION DELIVERY

compiled by

Allene Farmer Hayes

Congressional Services Team

Library of Congress

TABLE OF CONTENTS

INTRODUCTION

Advanced digital network development is a multifaceted enterprise encompassing a wide range of activities and issues. Expansion and modernization of the nation's information infrastructure is central to this effort. Equally important, however, are strategies to ensure that this infrastructure supports national priorities for education and research and development initiatives.

This compilation summarizes selected legislation in the 103rd Congress on electronic information delivery. These legislative proposals affect numerous policy issues, including fostering infrastructure development, applying the fruits of that development to schools and libraries, enhancing public access to government electronic information, and protecting intellectual property in a networked environment.

We have used six topic headings: Infrastructure Development, Government Information, Educational Applications, Library Applications, Health Services, and Privacy and Intellectual Property. Although some bills could be listed under several headings, we have tried to place each one under what we perceive to be its primary purpose.

H.R. 707 (Dingell)
Companion Measure S.335
Emerging Telecommunications Technologies Act of 1993
Amends the National Telecommunications and Information Administration Organization Act to require the Assistant Secretary of Commerce for Communications and Information and the Chairman of the Federal Communications Commission (FCC) to conduct, at least biannually, and to report to specified congressional committees, the FCC, and the Secretary of Commerce annually on, joint electromagnetic spectrum planning with respect to: (1) future spectrum requirements for public and private uses and the allocation actions to accommodate those uses; and (2) actions to promote the efficient use of the spectrum.
Introduced February 2, 1993. Referred to the House Committee on Energy and Commerce, Subcommittee on Telecommunications and Finance. Passed House on March 2, 1993. Received in Senate and Referred to Senate Committee on Commerce, Science and Transportation on March 3, 1993.
These bills are incorporated in H.R. 2264, the Omnibus Budget Reconciliation Act of 1993.

H.R. 1091 (Clinger)
A bill to establish the Commission on Information Technology and Paperwork Reduction. Introduced on February 24, 1993. Referred to House Committee on Government Operations, Subcommittee on Legislation and National Security. Establishes the Commission on Information Technology and Paperwork Reduction in order to minimize the information reporting burden imposed by the Federal Government, consistent with the information needs of the Government for policy purposes. Lists specific Commission functions, which include the study and review of former Commission on Paperwork recommendations for paperwork reduction. Requires a final Commission report to the Congress and the President and action by the Office of Management and Budget on Commission recommendations.

H.R. 1312 (Boucher)
Local Exchange Infrastructure Modernization Act of 1993 A bill to recognize the unique status of local exchange carriers in providing the public switched network infrastructure and to ensure the broad availability of advanced public switched network infrastructure.
Amends the Communications Act of 1934 to require the Federal Communications Commission (FCC) to exercise its authority to: (1) preserve and enhance universal telephone service at reasonable rates; (2) achieve universal availability of advanced network capabilities and information services; (3) assure a seamless nationwide

2

distribution network through joint network planning, coordination, and service arrangements between and among local exchange carriers (LECs); (4) maintain high standards of quality for advanced network services; and (5) assure adequate communication for the public health, safety, defense, education, national security, and emergency preparedness.

Introduced on March 11, 1993. Referred to House Committee on Energy and Commerce, Subcommittee on Telecommunications and Finance and to the House Committee on the Judiciary, Subcommittee on Economic and Commercial Law.

H.R. 1504 (Boucher)
Communications Competitiveness and
Infrastructure Modernization Act of 1993

A bill to encourage the modernization of the Nation's telecommunications infrastructure, to promote competition in the cable television industry and to permit telephone companies to provide video programming. Introduced on March 29, 1993. Referred to House Committee on Energy and Commerce, Subcommittee on Telecommunications and Finance.

Amends the Communications Act of 1934 to allow a common carrier to provide video programming directly to subscribers in its telephone service area through its own facilities or an affiliate. Authorizes the common carrier to provide channels of communications, pole line conduit space, or other rental arrangements to any entity which is directly or indirectly owned, operated, or controlled by it if such facilities or arrangements are to be used for, or in connection with, the provision of video programming directly to subscribers in the telephone service area of the common carrier.

Prohibits a common carrier from providing video programming directly to subscribers in its telephone service area unless the programming is provided through a separate video programming affiliate. Requires business arrangements and transactions between a common carrier and its video programming affiliate to be pursuant to regulations prescribed by the Federal Communications Commission and to be without cost to the telephone service ratepayers of the carrier.

Requires any common carrier which provides video programming directly to subscribers through an affiliate in its telephone service area to establish a basic video dial tone platform.

Requires such common carrier to make a maximum of 75 percent of the equipped capacity of its basic video dial tone platform available to unaffiliated video program providers. States that the carriage of local broadcast signals shall not constitute the provisions of affiliated video programming under this Act.

Sets forth prohibitions on: (1) cross-subsidization between telephone service and video programming by common carriers; and (2) common carrier buyouts of cable systems located in the carrier's telephone service area.

Requires the Commission to convene a Federal-State Joint Board to establish practices, classifications, and regulations necessary to ensure proper jurisdictional

3

separation and allocation of the costs of providing broadband services, including affiliated video programming.

Makes provisions of this Act inapplicable to video programming provided in a rural area by a common carrier that provides telephone exchange service in such area.

H.R. 1613 (Collins, C.)
Telecommunications Policy Coordination Act of 1993

A bill to improve coordination in the formulation of telecommunications policy within the executive branch. Introduced on April 1, 1993. Referred to House Committee on Energy and Commerce, Referred to Subcommittee on Telecommunications and Finance.

Establishes an Office of Telecommunications Policy (OTP) in the Executive Office of the President. Directs OTP to: (1) prepare national telecommunications policy options; (2) serve as the principal advisor to the President on telecommunications issues; (3) arbitrate telecommunications policy disputes among Federal agencies; (4) communicate the views of the agencies and the President concerning telecommunications policy to the Federal Communications Commission (FCC) and the Congress; and (5) monitor developments in telecommunications technology. Requires the Director of OTP to: (1) establish an Advisory Committee on Telecommunications Policy; and (2) report to the President and the Congress annually on OTP activities and on emerging trends in telecommunications.

Requires the FCC to report to the President and the Congress on its reasons for taking any final action which is inconsistent with views received from OTP.

H.R. 1757 (Boucher)
High Performance Computing and High Speed Networking Applications Act of 1993
National Information Infrastructure Act of 1993

A bill to provide for a coordinated federal program to accelerate development and dissemination of applications of high performance computing and high-speed networking. Introduced April 21, 1993. Referred to House Committee on Science, Space, and Technology, Subcommittee on Science. Hearings held by Subcommittee on May 6 and 11, ordered and reported as amended on June 30, 1993.

Amends the High-Performance Computing Act of 1991 to direct the Federal Coordinating Council for Science, Engineering, and Technology to: (1) establish an interagency applications program to develop applications of computing and networking advances under the National High-Performance Computing Program; and (2) develop a Plan for Computing and Networking Applications which shall identify application program goals and priorities and set forth specific Federal agency responsibilities.

Requires the Plan to: (1) foster local network access programs and their connection with Internet; and (2) develop projects and technologies in the fields of education, health care, libraries, and government information access.

Provides for the establishment of a high performance computing and applications advisory committee.

H.R. 2264 (Sabo)
Companion Measure, S. 1134
Omnibus Budget Reconciliation Act of 1993
Licensing Improvement Act of 1993
*Emerging Telecommunications Technologies Act of 1993
A bill to provide for reconciliation pursuant to section 7 of the concurrent resolution on the budget for fiscal year 1994. Incorporates **H.R. 707 and S. 335.** Introduced on May 25, 1993. House Committee on the Budget Reported an Original Measure, report No: 103-111. Passed House on May 27, 1993, Passed Senate in lieu of **S. 1134** on June 25, 1993, Senate also requested a conference.

S. 4 (Hollings)
Companion Measure H.R. 820
Manufacturing Technology and Extension Act of 1993
Information Infrastructure and Technology Act of 1992
National Competitiveness Act of 1993
Wind Engineering Program Act of 1992
A bill to promote the industrial competitiveness and economic growth of the United States by strengthening and expanding the civilian technology programs of the Department of Commerce, amending the Stevenson-Wydler Technology Innovation Act of 1980 to enhance the development and nationwide deployment of manufacturing technologies, and authorizing appropriations for the Technology Administration of the Department of Commerce, including the National Institute of Standards and Technology. Introduced on January 21, 1993. Referred to Senate Committee on Commerce, Science and Transportation. Committee hearings held February 24, 1993 and March 25, 1993. Ordered and reported as amended on May 25, 1993.
TITLE III--CRITICAL TECHNOLOGIES, Sec. 313. Technical Amendments
... (3) The Office of Technology Monitoring and Competitive Assessment is authorized to (A) act as a focal point within the federal government for the collection and dissemination, including electronic dissemination, of information on foreign process and product technologies, including information collected under the Japanese Technical Literature Program; (B) coordinate the extensive foreign technology monitoring and assessment activities already under way in the federal government; (C) act as an electronic clearinghouse for this information or otherwise provide this function

S. 335 (Innouye)
Companion Measure H.R. 707
Emerging Telecommunications Technologies Act of 1993

A bill to require the Secretary of Commerce to make additional frequencies available for commercial assignment in order to promote the development and use of new telecommunications technologies. Introduced on February 4, 1993. Referred to Senate Committee on Commerce, Science and Transportation, Subcommittee on Communications. Hearings held on March 17, 1993.

Directs the Assistant Secretary of Commerce for Communications and Information and the Chairman of the Federal Communications Commission (FCC) to conduct joint spectrum planning meetings. Directs the Secretary of Commerce to: (1) identify bands of frequencies that may be reallocated to commercial users; and (2) establish a related advisory committee. Directs the FCC to submit to the President and the Congress a plan for the distribution of the reallocated banks of frequencies under this Act.

Authorizes the President to reclaim reallocated bands of frequencies for reassignment to government stations.

This bill was also incorporated in H.R. 2264, the Omnibus Budget Reconciliation Act of 1993.

S. 473 (Johnston)
Department of Energy National Competitiveness
Technology Partnership Act of 1993

A bill to promote the industrial competitiveness and economic growth of the United States by strengthening the linkages between the laboratories of the Department of Energy and the private sector and by supporting the development and application of technologies critical to the economic, scientific and technological competitiveness of the United States. Introduced on March 2, 1993. Referred to Senate Committee on Energy and Natural Resources, Subcommittee on Energy Research and Development. Committee hearings held on March 18, 23 and 24, 1993. Reported to Senate (Amended) by Senate Committee on Energy and Natural Resources On June 24, 1993, report no.: 103-69.

Amends the Department of Energy Organization Act to authorize the Secretary of Energy and the directors of departmental laboratories (laboratories operated by or on behalf of the Department of Energy (DOE) or facilities that would be considered to be laboratories under the Stevenson-Wydler Technology Innovation Act of 1980) to enter into any partnership that will enhance the economic, scientific, or technological competitiveness of U.S. industry.

Directs the Secretary to develop a multi-year critical technology strategy for each critical technology listed in the National Critical Technologies Report. Authorizes the Secretary and the directors of departmental laboratories to enter into partnerships that build on the core competencies of the laboratories to conduct research, development, demonstration, or commercial application activities in areas listed in Report or in

energy efficiency or supply, high-performance computing, the environment, human health, advanced manufacturing technologies, advanced materials, transportation, space, or quality technologies, or technologies listed in the annual defense critical technologies plan.

Amends the High-Performance Computing Act of 1991 to provide for cost-shared projects involving DOE or DOE laboratories and non-Federal entities to test and apply high-performance computing and high-speed networking technologies.

S. 570 (Grassley)
Local Exchange Infrastructure Modernization Act of 1993

A bill to recognize the unique status of local exchange carriers in providing the public switched network infrastructure and to ensure the broad availability of advanced public switched network infrastructure. Introduced on March 11, 1993. Referred to Senate Committee on Commerce, Science and Transportation.

Amends the Communications Act of 1934 to require the Federal Communications Commission (FCC) to exercise its authority to: (1) preserve and enhance universal telephone service at reasonable rates; (2) achieve universal availability of advanced network capabilities and information services; (3) assure a seamless nationwide distribution network through joint network planning, coordination, and service arrangements between and among local exchange carriers (LECs); (4) maintain high standards of quality for advanced network services; and (5) assure adequate communication for the public health, safety, defense, education, national security, and emergency preparedness.

Requires the FCC to prescribe regulations that require: (1) joint coordinated network planning, design, and cooperative implementation among all LECs in the provision of public switched network infrastructure and services; (2) development of standards for interconnection between the LEC public switched network and others by appropriate standard-setting bodies; and (3) a LEC to share public switched network infrastructure and functionality with requesting LECs which serve a geographic area for which they lack economies of scale or scope for the particular required network functionality.

S. 1086 (Danforth)
Telecommunications Infrastructure Act of 1993

A bill to foster the further development of the Nation's telecommunications infrastructure through the enhancement of competition. Introduced on June 9, 1993. Referred to Senate Committee on Commerce, Science and Transportation.

H.R. 629 (Owens, M.)
Improvement of Information Access Act of 1993
A bill to amend title 44, United States Code, to promote improved public dissemination of Government information. Introduced on January 26, 1993. Referred to House Committee on Government Operations, Subcommittee on Information, Justice, Transportation and Agriculture.

Requires agencies to: (1) disseminate information in diverse modes and through appropriate outlets that will permit and broaden public access to Government information; and (2) use depository libraries, national computer networks, and other distribution
channels that improve and assure free or low-cost public access to Government information.

H.R. 1328 (Rose)
Companion Measure S.564--P.L. 103-40
Government Printing Office Electronic
Information Access Enhancement Act of 1993
A bill to establish in the Government Printing Office a means of enhancing electronic public access to a wide range of Federal electronic information. Introduced on March 11, 1993. Referred to House Committee on House Administration. On April 1, 1993 reported to House by Committee, report no.: 103-51.

Requires the Superintendent of Documents, under the direction of the Public Printer, to establish a means for providing the public with online access to electronic public information of the Federal Government.

Sets forth guidelines for determining fees for accessing such information. Permits depository libraries to access information through such means without charge.

Requires the Public Printer to report to the Congress on the savings resulting from such online public access to government information and on the status of the system providing such access.

S. 560 (Nunn)
Paperwork Reduction Act of 1993
A bill to further the goals of the Paperwork Reduction Act to have Federal agencies become more responsible and publicly accountable for reducing the burden of Federal paperwork on the public, and for other purposes. Introduced on March 10, 1993. Referred to Senate Committee on Governmental Affairs.
TABLE OF CONTENTS
Title I: Authorization of Appropriations

Title II: Reducing the Burden of Federal Paperwork on the Public   Title III: Enhancing Federal Agency Responsibility and Accountability for Reducing The Burden of Federal Paperwork

Title IV: Enhancing Government Responsibility and Accountability for Reducing the Burden of Federal Paperwork

Title V: Enhancing Agency Responsibility for Sharing and Disseminating Public Information

Title VI: Additional Government Information Management Responsibility

Requires a Government-wide paperwork reduction goal of at least five percent and individual agency goals that aggregate to the Government-wide goal.

Title V: Enhancing Agency Responsibility for Sharing and Disseminating Public Information - Provides for Government-wide standards for sharing and disseminating public information.

Imposes certain responsibilities on Federal agencies for sharing and disseminating public information.

Abolishes the Federal Information Locator System established in the Office of Information and Regulatory Affairs and replaces it with a system in each agency for providing public access via electronic and other means to a comprehensive inventory of agency information dissemination products.

Provides for the use of electronic information collection and dissemination techniques to reduce the Federal paperwork burden.

S. 564--P.L. 103-40 (Ford)
Companion Measure, H.R. 1328
Government Printing Office Electronic Information
Access Enhancement Act of 1993

A bill to establish in the Government Printing Office a means of enhancing electronic public access to a wide range of Federal electronic information. Introduced on March 11, 1993. Referred to Senate Committee on Committee on Rules and administration. Passed Senate on March 22, 1993, passed House on May 25, 1993, signed into law on June 8, 1993.

Requires the Superintendent of Documents, under the direction of the Public Printer, to establish a means for providing the public with online access to electronic public information of the Federal Government.

Sets forth guidelines for determining fees for accessing such information. Permits depository libraries to access information through such means without charge.

Requires the Public Printer to report to the Congress on the savings resulting from such online public access to government information and on the status of the system providing such access.

S. 681 (Glenn)
Paperwork Reduction Reauthorization Act of 1993
Regulatory Review Sunshine Act of 1993

A bill to amend chapter 35 of title 44, United States Code, relating to Government paperwork reduction, to modify the Federal regulatory review process. To ensure the greatest possible public benefit from information collected, maintained, used, disseminated, and retained by the federal government. Introduced on March 31, 1993. Referred to Senate Committee on Governmental Affairs.

EDUCATIONAL APPLICATIONS

H.R. 856 (Owens, M.)
Educational Research, Development,
and Dissemination Excellence Act

A bill to improve education in the United States by promoting excellence in research, development, and the dissemination of information. Introduced on February 4, 1993. Referred to House Committee on Education and Labor, Subcommittee on Select Education and Civil Rights. Subcommittee hearings held on May 27, 1993. Field hearings held in New York, New York on June 19, 1993.

TABLE OF CONTENTS:

Title IV: - Amends GEPA to establish within OERI an Office of Reform Assistance and Dissemination (Dissemination Office), through which the Secretary shall carry out a national education dissemination system for school improvement. Provides for Dissemination Office functions and duties, including: (1) identification, designation, and dissemination of exemplary and promising programs including certain training, technical, and financial assistance; (2) 16 Education Resources Information Clearinghouses; (3) dissemination through new technologies; (4) an electronic network for sources of materials and research about teaching and learning for improving nationwide education (SMARTLINE) to link various educational research and other entities; (5) an electronic networking and resource-sharing for school improvement program of grants to State education agencies; (6) a networked system of the ten regional educational laboratories; (7) an America 2000 Communities Special Assistance Program, with grants for Learning Grant Institutions and District Education Agents

within eligible communities, development of a comprehensive America 2000 plan for assuring educational success for all students in the community, and implementation of a community-wide plan for educational improvement; (8) the Teacher Research Dissemination Network (regional partnerships for teacher change agents); and (9) the existing National Diffusion Network and its Developer-Demonstrator and State Facilitator projects.

H.R. 2268 (Brown)
A bill to facilitate the development of an integrated, nationwide telecommunications system dedicated to instruction by guaranteeing the acquisition of a communications satellite system used solely for communications among State and local instructional institutions and agencies and instructional resource providers. Introduced on May 26, 1993. Referred to House Committee on Education and Labor, Subcommittee on Elementary, Secondary and Vocational Education.

S. 264 (Bingaman)
Technology for the Classroom Act of 1993
A bill to establish a Classrooms for the Future program. Directs the Secretary of Education to award competitive grants to eligible consortia to develop instructional programs and technology-based systems for complete courses or units of study for a specific subject and grade level, if these are commercially unavailable locally. Introduced on January 28, 1993. Referred to Senate Committee on Labor and Human Resources.

S. 1040 (Bingaman)
Technology for Education Act of 1993
A bill to support systemic improvement of education and the development of a technologically literate citizenry and internationally competitive work force by establishing a comprehensive system through which appropriate technology-enhanced curriculum, instruction, and administrative support resources and services, that support the National Education Goals and any national education standards that may be developed, are provided to schools throughout the United States. Introduced on May 27, 1993. Referred to Senate Committee on Labor and Human Resources.
TABLE OF CONTENTS:
Title I: Leadership for Technology in Education
Title II: School Technology Support
Title III: Information Dissemination, Technology Training and Technical Assistance
Title IV: Educational Technology Product Development, Production, and Distribution
Title V: Educational Technology Research, Development and Assessment

LIBRARY APPLICATIONS

S. 345 (Pell)
Library of Congress Fund Act of 1993

A bill to authorize the Library of Congress to provide certain information products and services.

Expresses the intent of the Congress that core Library of Congress services shall continue to be provided at no cost.

Defines: (1) "core library products and services" as domestic interlibrary loan and information products and services customarily provided by libraries to users at no charge; and (2) "specialized library products and services" as specified customized information products and services that exceed core services, that are not national library products and services, and that are designed for individuals or discrete groups of persons or entities.

Declares that this Act shall not modify Federal copyright law.

Introduced on February 4, 1993. Referred to Senate Committee on Committee on Rules and Administration. Committee Consideration and Mark-up Session held on May 20, 1993. Reported to Senate (amended) by Senate Committee on Rules and Administration on May 26, 1993, report no.: 103-50. Questions were raised by Senators DeConcini and Feinstein which resulted in a meeting of all interested parties including House and Senate Judiciary Committee staff on June 4. Discussions focused upon amendments proposed by the information and publishing industries.

S. 626 (Kerrey)
Electronic Libraries Act of 1993

A bill to establish a system of State-based electronic libraries. Provides for a system of State-based electronic libraries which (1) allows delivery of or access to a vast array of interactive, multimedia educational programs, research and information data and services, and networking opportunities; (2) seeks to make such materials available to the public via public libraries, electronic databases and telecommunications systems such as the Internet and other networks. Authorizes the National Science Foundation, the Department of Education, the Department of Commerce, the Defense Advanced Research Projects Agency, and the Library of Congress to make multi-year grants to states to develop electronic libraries. Introduced on March 22, 1993. Referred to Senate Committee on Commerce, Science and Transportation.

HEALTH SERVICES

S. 1088 (Harkin)
Rural Telemedicine Development Act of 1993
A bill to amend the Public Health Service Act to provide grants for the development of rural telemedicine. Introduced on June 10, 1993. Referred to Senate Committee on Agriculture, Nutrition, and Forestry.

S. 1143 (Baucus)
A bill to improve the delivery of health care services in rural areas by creating an Assistant Secretary for Rural Health, to amend title XVIII of the Social Security Act to provide that medical assistance facilities be reimbursed based on reasonable cost, to establish a grant program for the use of interactive telelecommunications systems, and to adjust the payments made for certain direct graduate medical education expenses. Introduced on June 22, 1993. Referred to Senate Committee on Finance.

PRIVACY AND INTELLECTUAL PROPERTY

H.R. 12 (Hughes)
A bill to amend title 17, United States Code, with respect to infringement of copyright. Makes a television broadcast station an infringer of copyright and subject to civil remedies (including attorney's fees and litigation costs) if such station, without the express written consent of the copyright owner, authorizes the secondary transmission by a cable system or other multichannel video programming distributor of a copyrighted work broadcast by such station. Introduced on January 5, 1993. Referred to House Committee on the Judiciary, Subcommittee on Intellectual Property and Judicial Administration.

H.R. 135 (Collins, C.)
Individual Privacy Protection Act of 1993
A bill to amend the privacy provisions of title 5, United States Code, to improve the protection of individuals information and to reestablish a permanent Privacy Protection Commission as an independent entity in the Federal Government.
Establishes an Individual Privacy Protection Board to: (1) study the data banks, automated data processing programs, and information systems of public and private organizations to determine standards and procedures in force for the protection of personal information; ... and (5) comment on the implications for data protection of

proposed Federal, State, or local statutes, regulations, or procedures. Provides penalties for violations of privacy rights.

Introduced on January 5, 1993. Referred to House Committee on Government Operations, Subcommittee on Information, Justice, Transportation and Agriculture.

H.R. 759 (Boucher)
Compulsory License Clarification Act of 1993

A bill to amend chapter 1 of title 17, United States Code, to include in the definition of a cable system a facility which makes secondary transmissions by microwave or certain other technologies. Introduced on February 3, 1993. Referred to House Committee on the Judiciary, Subcommittee on Intellectual Property and Judicial Administration. Subcommittee hearings held on March 17, 1993.

H.R. 897 (Hughes)
Companion Measure - S. 373
Copyright Reform Act of 1993

A bill to amend title 17, United States Code, to modify certain recordation and registration requirements, to establish copyright arbitration royalty panels to replace the Copyright Royalty Tribunal. Introduced on February 16, 1993. Referred to House Committee on the Judiciary, Subcommittee on Intellectual Property and Judicial Administration. Subcommittee hearings held on March 3 and 4, 1993.

H.R. 1103 (Hughes)

A bill to amend title 17, United States Code, with respect to secondary transmissions of superstations and network stations for private home viewing, and with respect to cable systems. Introduced on February 24, 1993. Referred to House Committee on the Judiciary, Subcommittee on Intellectual Property and Judicial Administration. Subcommittee hearings held on March 17, 1993.

H.R. 2576 (Hughes)
Digital Performance Right in Sound Recording Act of 1993

A bill to amend title 17, United States Code to provide an exclusive right to perform sound recordings publicly by means of digital transmissions. Introduced on July 1, 1993. Referred to House Committee on the Judiciary, Subcommittee on Intellectual Property and Judicial Administration.

S. 23 (Hatch)

A bill to amend title 17, United States Code, to clarify news reporting monitoring as a fair use exception to the exclusive rights of a copyright owner. Introduced on January 21, 1993. Referred to Senate Committee on the Judiciary, Subcommittee on Patents, Copyrights and Trademarks.

APPENDIX B: CURRENT GOVERNMENT-SPONSORED RESEARCH
INITIATIVES IN DIGITAL LIBRARIES

prepared by
White House Office of Science and Technology Policy

Current Government-sponsored Research Initiatives in Digital Libraries

Prepared by the White House Office of Science and Technology Policy

12 July 1993

While there is congressional legislation that would expand government-sponsored research in the area of digital libraries there are also important research initiatives already underway.

"Linking Electronic Libraries" is an Advanced Research Projects Agency (ARPA) project to be carried out over three years by the Corporation for National Research Initiatives (CNRI) in Reston, VA. This is a small prototype of an electronic copyright management system that initially will store and disseminate technical reports in the field of computer science. It will link together Carnegie-Mellon, MIT, Stanford, Cornell, the University of California, ARPA, and the Library of Congress. It will address such issues as electronic submission of documents (security and integrity), storage in an online repository, the digital transfer of rights and permissions, electronic payment, and user interfaces. It is an experiment designed to help lay the groundwork for a national electronic library of scientific and technical information. Although the immediate goal of the project is to facilitate access to computer science research results, it also has the goal of producing standard protocols for search and retrieval, authentication, access control, bibliographic rights and permissions management, and image collection and storage. This initiative is funded at a level of $2.8M for the first year, and $2.5M for the second and third years.

A joint Nationalal Science Foundation (NSF) initiative is more research-oriented, focusing upon the technologies involved in accessing digital libraries. These include advanced software for browsing and searching information in a variety of formats, the utlization of networked databases (meaning elements of them are stored in different locations), and the capture and categorization of information in a number of formats. This is seen as an extension of NSF's support of the concept of a collaboratory, a distributed computer system with networked laboratory instruments, tools that enable a variety of collaborative activities, the resources for maintaining, evolving, and assisting in the use of computer-based facilities, and digital libraries that include tools for organizing, describing, and managing data, thus enabling the large-scale sharing of data. Phase I of this activity will be announced in July, while Phase II depends upon the outcome of congressional legislation. NSF and ARPA wish to commit $5-6M to this for four years. Phase II would include participation from other government agencies as well as state governments and industry.

Other research initiatives will come from the Information Infrastructure Technology and Applications Program, a component of the High Performance Computing and Communications (HPCC) program which the Administration created earlier this year. Research under this program will include services necessary for the efficient operation of the National Information Infrastructure such as conventions and standards for handling data in different media, the development tools for the creation of services, and work on intelligent user interfaces. Among the areas in which these services, tools, and interfaces will be applied will be the area of digital libraries. In Fiscal Year 1994 $96M has been requested for this new addition to the HPCC program.

APPENDIX C: WAIS BIBLIOGRAPHY

WAIS Bibliography

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Hard copies of most of the following documents are available. Some
documents are available electronically, as stated, but might not contain figures
in the ascii version.
Email, fax, mail or phone your name, address, email and phone number to:
Barbara Lincoln Brooks, WAIS Inc, 1040 Noel Drive, Menlo Park, CA, 94025,
phone: 415-327-WAIS, fax: 415-327-6513, email: barbara@wais.com
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/pub/wais-doc/UWO-wais-paper.ps@ftp.wais.com

Personal Computing: Collective Dynabases, Communications of the ACM, Larry Press, June 1992, pp26-32.
Overview of WAIS and commercial projects.

WAIS: A New Development in Information Services, MIT I/S Newsletter, T. MacRae and S. Jones, June, 1992.
Overview of WAIS by the Network Services and Publication Services at MIT.
Available via anonymous ftp:
/pub/wais-doc/MIT.IS.news@ftp.wais.com

WAIS: Wide Area Information Servers, Information Intelligence Inc., George S. Machovec, March 1992, pp1-5.
Overview of WAIS from a librarian perspective.
Available via anonymous ftp:
/pub/wais-doc/lib.perspective@ftp.wais.com

WAIS - Making it Easier to Access Internet Resources, Merit/NSFNET Link Letter newsletter, Brewster Kahle, March/April 1992. Overview of WAIS.
(reprinted from CERFnet News, Volume 3 Number 6)
Available via anonymous ftp:
/pub/wais-doc/linkletter@ftp.wais.com

WAIS: Is It the Lotus 1-2-3 of the Internet?, Communications Week, Carl Malamud, March 16, 1992, pp17.
Brief article of WAIS on the Internet.

Where There's a Will, There's a WAIS, <u>Digital Media - A Seybold Report</u>, Denise Caruso, February 17, 1992, pp5-6.
Article touching on several issues of wais, such as protocol, client/server relationship, "for pay" servers, and legal issues.

The Reading Room, <u>Digital Media - A Seybold Report</u>, Brewster Kahle, February 17, 1992, pp7-8.
Essay on the controversy between private ownership of information and public access to information.

The Promise of the WAIS Protocol, <u>UNIX Today!</u>, Jason Levitt, December 9, 1991, pp44, 47-48.
Article describing the freeware release.

The Global Village Starts with WAIS, Tomaso Poggio, December 1991, Overview of WAIS in Italian.

Network to Unite Data Bases, <u>San Jose Mercury News</u>, John Markoff, July 21, 1991, pp1F.
Rewriting of the "For the PC User, Vast Libraries," New York Times article with emphasis on Apple component.

For Shakespeare, Just Log On, <u>New York Times</u>, John Markoff, July 3, 1991, ppC1.
Overview of WAIS Internet experiment.

Browsing Through Terabytes, <u>Byte Magazine</u>, Richard Stein, May 1991, pp157-164.
Readable article on what a large WAIS system looks like.

WAIS Promises Easy Text Retrieval, <u>MacWEEK</u>, Henry Norr, May 14, 1991, pg22.
Report on the Peat Marwick WAIS system.

Release 1.0, <u>Release 1.0</u>, Esther Dyson, April 1991, entire issue.
In-depth article on commercial systems and protocols, featuring WAIS. (Hardcopy copies available from: EDventure Holdings, 375 Park Ave., New York, NY 10152; (212) 758-3434)
Anonymous FTP:
/pub/wais-doc/release1.0@ftp.wais.com
WAIS server: wais-discussion-archives.src

Designing a Desktop Information System: Observations and Issues, Thomas Erickson & Gitta Salomon, Apple Computer. Human Factors in Computing Systems, <u>CHI '91 Conference Proceedings</u> (pp49-54) April 1991, New Orleans. New York: ACM, 1991.
Early paper on the Apple interface for WAIS.

An Analysis of the Effects of Data Corruption on Text Retrieval Performance, S. Smith, C. Stanfill, December 1988. Thinking Machines Corporation technical report TMC-68.

Z39.50 & WAIS Protocol
****

Z39.50-1988: Information Retrieval Service Definition and Protocol Specification for Library Applications. National Information Standards Organization (Z39), P.O. Box 1056, Bethesda, MD 20817. (301) 975-2814. Available from Document Center, Belmont, CA. Telephone 415-591-7600.

Z39.50-1992 Version 2 Final Text, July 1992. Working copy of the latest Z39.50 implementors group. National Information Standards Organization (Z39), P.O. Box 1056, Bethesda, MD 20817. (301) 975-2814. Available from Transitions, 908-932-2280.

Z39.50-1991 Version 2, May 1991. Electronic version of the working copy of the Z39.50 implementors group. Anonymous FTP: /pub/protocol/z3950-v2d3.txt@ftp.wais.com or WAIS server wais-docs.

Z39.50-1992 Version 3, Draft 7, June 1993. Electronic version of the working copy of the Z39.50 implementors group. Anonymous FTP: /pub/protocol/z3950-v3d7.txt@ftp.wais.com.

The Z39.50 Information Retrieval Protocol: An Overview and Status Report, Clifford Lynch, Computer Communication Review ACM SIGCOMM Introduction to the protocol of WAIS.

The Z39.50 Protocol in Plain English, Clifford Lynch. Fall 1992. Available via anonymous ftp: /pub/protocol/plain.english@ftp.wais.com

Electronic Services
****

wais-discussion@think.com: Bi-weekly digest of mail from users and developers on Electronic Publishing (includes all wais-interest postings). Requests to wais-discussion-request@think.com. Anonymous FTP access to archives: /pub/mail-archives/wais-discussion/issue-*@wais.com

wais-talk@think.com: interactive list of developers. A couple notes a day. Requests to wais-talk-request@think.com. Archives are available on WAIS server wais-talk-archives.src

comp.infosystems.wais: a netnews discussion group on WAIS issues. All postings to wais-discussion@Think.COM go to that group as well.

Z3950iw: Z39.50 Implementors list for low level discussions of protocol details. Requests to LISTSERV@NERVM.NERDC.UFL.EDU

Freeware Servers:

NeXT:	/pub/freeware/next/*@ftp.wais.com
RS6000:	/pub/freeware/rs6000/*@ftp.wais.com
SGI:	/pub/freeware/sgi/*@ftp.wais.com
Source Code:	/pub/freeware/unix-src/wais-8-*.tar.Z@ftp.wais.com
SUN:	/pub/freeware/sun/*@ftp.wais.com

Freeware Clients:

Mac:	by Harry Morris, WAIS Inc.
	/pub/freeware/mac/*@ftp.wais.com
WINDOWS:	by Tim Gauslin, USGS
	/pub/freeware/windows/wnwais*.zip@ftp.wais.com or
	by Kevin Gamiel, MCNC CNIDR
	/pub/NIDR.tools/wais/pc/windows@ftp.cnidr.org
XWAIS:	by Jonathan Goldman, Thinking Machines Corporation
	/pub/freeware/unix-src/wais-8-*.tar.Z@ftp.wais.com
DOS:	by Jim Fullton, University of North Carolina
	/pub/wais/DOS/*@sunsite.unc.edu or
	/pub/tcpip/pcwais.zip@hilbert.wharton.upenn.edu
EMail:	by Jonathan Goldman, Thinking Machines Corporation
	send message to waismail@quake.think.com,
	"search <source-name> {keywords}" or
	"retrieve DOCID" (DOCID as returned by a search)
OS2:	by Kevin Oliveau of WAIS Inc., Julie Mills and the
	Library of Congress
	/pub/freeware/os2/*@ftp.wais.com
Telnet access:	telnet quake.think.com login wais,
(uses SWAIS)	password user@host
SWAIS:	by John Curran, BBN
	/pub/freeware/unix-src/wais-8-*.tar.Z@ftp.wais.com
NeXT:	by Paul Burchard, University of Utah
	/pub/freeware/next/*@ftp.wais.com
GWAIS:	by Jonathan Goldman, Thinking Machines Corporation
(Gnu Emacs)	/pub/freeware/unix-src/wais-8-*.tar.Z@ftp.wais.com
Openlook:	by Simon Spero, University of North Carolina
	/pub/freeware/open-look/*@ftp.wais.com
VMS:	by Jim Fullton, University of North Carolina
	/pub/wais/vms/*@sunsite.unc.edu
SunView:	/pub/wais/sunview/*@sunsite.unc.edu
IBM Mainframe:	by Tim Gauslin, USGS
	/pub/freeware/ibm-mvs/*@ftp.wais.com

WAIS Videos
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Special Interest Group on Wide Area Information Servers: Conference Held March 19, 1993, Open-File Report 93-252, United States Geological Survey video on WAIS, VHS videotape $20. Send orders to Book and Open-File Report Sales, USGS, Federal Center, Box 25286, MS 306, Denver, Colorado, 80225.

Wide Area Information Servers Class: Indexer and Server, Open-File Report 93-253, United States Geological Survey training video on WAIS, VHS videotape, 2-tape set $40. Send orders to Book and Open-File Report Sales, USGS, Federal Center, Box 25286, MS 306, Denver, Colorado, 80225.

Macintosh Demostration Screen-Movie, Steve Cisler put together a short screen-recorder movie for seeing some of what WAIStation (Mac client) does. Available via anonymous FTP:
/pub/wais-doc/WAIStation-Canned-Demo.sit.hqx@ftp.wais.com

Internet   Information
****

The Whole Internet: User's Guide & Catalog, Ed Krol, O'Reilly & Associates, Inc, 1992. (Chapter 12 entitled "Searching indexed databases: WAIS")

Exploring the Internet: A Technical Travelogue, Carl Malamud, Prentice Hall, 1992.

Internet access providers in the United States, The general types of services they provide, and how to contact them. From Chapter 4 of the book, "Internet: Getting Started". For more information about "Internet : Getting Started", contact SRI International at 415-859-3695, nisc@nisc.sri.com.

Internet access providers outside the United States. From Chapter 7 of the book, "Internet: Getting Started". For more information about "Internet : Getting Started", contact SRI International at 415-859-3695, nisc@nisc.sri.com.

Public Dialup Internet Access List (PDIAL), February 1993. A list of public access service providers offering dialup access to outgoing Internet connections such as FTP and telnet. Available by sending email to "info-deli-server@netcom.com", with the message subject "send PDIAL".

Other services that can gateway to WAIS services:
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Gopher
by the University of Minnesota
Via anonymous ftp:
/pub/gopher@   boombox.micro.unm.edu

World Wide Web
by Tim Berners-Lee
Via anonymous ftp:
/pub/www/src@info.cern.ch

Freeware   Information
****

For information on WAIS freeware or the Clearinghouse of Networked Information Discovery and Retrieval (CNIDR), contact Jane Smith at jane.smith@cnidr.org or 919-248-9213. The director of the freeware is George Brett at ghb@jazz.concert.net or 919-962-1000.

APPENDIX D: BRIEF DESCRIPTION OF WAIS SOURCES

by
Chris Christoff

Brief Description of WAIS Sources

A brief description of the content
of many WAIS sources on the
Internet, grouped into relevant categories.

Chris Christoff
Bond University
chrisc@bu.oz.au

External Sources
These are sources external to Bond University, i.e. out there on the Internet. A grouping of the sources into subject categories has been attempted.

Note: sources marked (*) have limited hours of availability.
        sources marked (#) support boolean, partial word and literal searches
This document is an extension and reorganisation of a great document from the University of Melbourne, Australia.

Aeronautics
aeronautics.src .... Contents of the aeronautics mailing list ftp area from University of Texas, covering many topics of aeronautics, flying and aircraft

Archaeology
archaeological_computing,src .... Bibliography of papers on computing as applied to archaeology (BibTeX format)

Astronomy
astro-images-fits.src .... Astronomical images in FITS format
astro-images-gif.src .... Astronomical images in GIF format

Biology
alt.drugs.src .... Oregon State University alt.drugs newsgroup archive

Arabidopsis_BioSci.src .... Index of arabidopsis conference, and bionet newsgroup and mailing list messages

Arabidopsis_thaliana_Genome.src AAtDB database including genetic maps, strains, clones, colleague contacts and more

biology-compounds.src .... Database of metabolic intermediate compounds

biology-journal-contents.src ...... Periodical references to journals in the field of molecular biology

bionic-ai-researchers.src .... Database of molecular biologists working in the field of AI

bionic-algorithms.src .... Literature references to molecular biology algorithms

bionic-arabidopsis.src .... Database of arabidopsis research workers

bionic-biosci-docs.src .... Files from the BioSci network

bionic-databases-limb.src .... List of databases available to molecular biologists

bionic-directory-of-servers .... Indexes `bionic' sources in Finland

bionic-embl-software.src .... A list of software available from EMBL

bionic-enzclass.src ....use in conjunction with the enzyme source

bionic-enzyme.src .... Amos Bairoch's enzyme database

bionic-genbank-software.src ..... A list of software forGenbank database

bionic-info-gcg-archive.src .... Log files from the INFO-GCG listserver

bionic-journal-contents.src .... Literature references from molecular biology journals

bionic-networking.src .... Texts to explain networking to biologists

bionic-sequence-bibliography .... Sequence analysis literature reference database

biosci.src .... Archive of articles posted to BIOSCl mailing lists and newsgroups since 1989

Caenorhabditis_elegans_Genome.src A database of C. elegans information (e.g. DNA sequence, genetic map etc)

cldb.src .... Animal cell lines available in European research labs

EC-enzyme.src .... EC enzyme database
IUBio-arcdocs.src .... Index of abstracts, help files and information on Indiana University Archive of Biology Software

		and Data
IUBio-fly-address.src	....	Index of addresses of Drosphila researchers (#)
IUBio-fly-amero.src	....	Database of polytene chromosone sites that bind antibodies to Drosphila proteins (#)
IUBio-fly-clones.src	....	Index to sources of information on Drosphila melanogaster genetics (#)
IUBio-fly-din.src	....	Index of electronic Drosphila newsletter (#)
IUBio-flybase.src	....	Index of Drosphila database 'Flybase' (#)
IUBio-flystock-bg.src	....	Index of Drosphila fruit fly stocks at stockcentre at Bowling Green, USA (#)
IUBio-flystock-bl.src	....	Index of Drosphila fruit fly stocks at stockcentre at Bloomington, USA (#)
IUBio-flystock-um.src	....	Index of Drosphila fruit fly stocks at stockcentre at Umea, Sweden (#)
IUBio-gbnew.src	....	Index of updates of gene sequences since the last Genbank update (#)
IUBio-genbank.src	....	Index of Genbank databank gene sequences (#)
IUBio-netnews.src	....	Index of articles from Bio newsgroups and mailing lists (#)
Molecular-biology.src	....	Annotation of the GenBank DNA sequence database
online-mendelian-inheritance-in-man.src		Catalogues of Autosomal Dominant, Autosomal Recessive and X-Linked Phenotypes
NIH-Guide.src	....	US National Institutes of Health Guide to Grants and Programs for biomedical researchers
prosite.src	....	A dictionary of protein sites and patterns
rebase-enzymes.src	....	The REBASE restriction database of Richard Roberts Cold Spring Harbor Laboratory
RPMS-pathology.src	....	Royal Postgraduate Medical School histo-pathological images (gif) and documents on mammalian endocrine tissues

Chemical Engineering

| chem-eng-current-contents.src | ... | Chemical engineering bibliography |

Computer Platforms

comp.admin.src	....	Previous 10 days news in newsgroup comp.admin
comp.sys.src	....	Previous 10 days news in comp.sys*
scsi-2.src	....	Small Computer System Interface-2 draft ANSI standard

Amiga

amiga_fish_contents.src	....	Index of Fred Fish's disk #1 of Amiga software
amiga-slip.src	....	Archive of mailing list on Amiga wide area networking
archie.au-amiga-readmes.src	.....	Index of readme, index and contents files for Amiga software on archie.au

Macintosh

archie.au-mac-readmes.src	....	Index of the Readme, Index and Contents files for the Mac archive on `archie.au'
info-mac.src	....	Archive of the info.mac discussion forum
mac.FAQ.src	....	Archive of mac.alt.FAQ news group
macintosh-tidbits.src	....	Tidbits electronic magazine for the Mac (*)

Next

| NeXT.FAQ.src | .... | Information about NeXT computer systems |
| NeXT-Managers.src | .... | Archive of postings from mailing list for administrators of NeXT systems |

PC

archie.au-pc-readmes.src .... Index of Readme, Index and Contents files for amiga archives on 'archie.au'

cica-win3.src .... Index to CICA (Centre for Innovative Computing Applications) Windows 3 archive

ibm.pc.FAQ.src .... Information about IBM PC systems

Sun Microsystems

alt.sys.sun.src .... Archived news articles from alt.sys.sun newsgroup

sun-admin.src .... Archive of comp.sys.sun newsgroup

sun-announce.src .... Archive of comp.sys.sun announce newsgroup

sun-apps.src .... Archive of comp.sys.sun.apps newsgroup

sun-fixes.src .... Sun Microsystem's bug patches README files

sun-hardware.src .... Archive of comp.sys.sun.hardware newsgroup

sun-manager-summary.src .... Index of sun-managers mailing list summaries (#)

sun-misc.src .... Archive of comp.sys.sun.misc newsgroup

sun-openlook.src .... Archive of comp.windows.open-look newsgroup

SunSITE-ftp.src .... Index of all of the index and README files in SunSITE ftp archive (which contains s/w, pictures, sounds and documents for Sun computers

sun-spots.src .... Archive of the Sun-Spots digest and Sun Managers mailing list that discuss computers from Sun Microsystems

sun-wanted.src .... Archive of comp.sys.sun.wanted newsgroup

sunflash-1990.src .... 1990 issues of The Florida Sunflash journal

sunflash-1991.src .... 1991 issues of The Florida Sunflash journal

sunflash-1992.src .... 1992 issues of The Florida Sunflash journal

Supercomputers

San_Diego_Super_Computer_Center_Docs.src .. Some of the copyrighted documents available from SDSC's online system (userguides, Cray languages, math libraries etc)

Unix

comp.windows.x.motif.src .... Archive of newsgroup on X-windows and motif

posix.1003.2.src .... Portable Operating System for Unix draft standards

UC-motif-FAQ.src .... Frequently Asked Questions on motif from the comp.windows..x.motif newsgroup

unix.FAQ.src .... Information about UNIX

unix-manual.src .... Manual pages for UNIX

Computer Science

bib-dmi-ens-fr.src .... Bibliography of books and conference proceedings on maths and comp sci (French keywords)

bibs-zenon-inria-fr.src .... Bibliograpy of books, conference proceedings, theses, periodicals, research reports on sotware engineering and mathematics (french keywords)

cacm.src .... Communications of the ACM April '89 - April '92

comp.archives.src .... Archive of comp.archives newsgroup, giving an index of ftp accessible files

Comp-Sci-Tech-Reports.src ...... Computer science technical reports, abstracts and papers from various FTP sites

cscwbib.src .... Bibliography of computer supported cooperative work (refer format)

cs-journal-titles.src .... Article title and authors from over 600 computing journals, conference proceedings, books and seminars

cs-techreport-abstracts.src .... Titles and authors of some 5100 comp sci techreports, pre/reprints, notes and papers

cs-techreport-archives.src	List of sites that archive compsci reports
cs-techreports.src	Index of 2000 comp sci technical reports from ftp sites
Func-Prog_Abstracts.src	Small collection of computer science tech reports, abstracts and papers on functional programming
lolita-dator.src	Bibliography of a selection of computer related literature from Lund University, Sweden
lp-bibtex-zenon-inria-fr.src	Proceedings from conferences on Logic Programming (bibtex format)
machos-bibtex-zenon-inria-fr	Bibliography on MACH operating system (bibtex format)
merit-archive-mac.src	Index of some 2000 Mac programs available via ftp from mac.archive.umich.edu
meval-bibtex-zenon-inria-fr	Bibliography of MEVAL project - network queueing theory and modelling (french and english, bibtex format)
MIT-algorithms-bug.src	Bug lists for the book `Introduction to Algorithms'
MIT-algorithms-exercise.src	Exercises to be used with `Introduction to Algorithms'
MIT-algorithms-suggest.src	Suggestions submitted by readers of `Introduction to Algorithms'
monashuni-papers.src	List of articles from many computing journals
monashuni-techreports.src	A list of archive sites that maintain Computer Science technical reports
neuroprose.src	Index to papers on neural networks on archive.cis.ohio-state.edu
nren-bill.src	U.S. High Performance Computing Act 1991
open_systems_calendar.src	Calendar of upcoming events related to Open Systems computing
ra-mime-zenon-inria-fr.src	Comp Sci and engineering reports from National Institute of Research in Computer Science and Control (mime format)
ra-zenon-inria-fr.src	1990 activity reports from National Institute of Research in Computer Science and Control (french keywords, DVI format)
risks-digest.src	Collection of the RISKS digest which discusses the risks involved with using computers
SDSC_Docs.src	San Diego (State Uni) Supercomputer Centre information and documentation
software-eng.src	Archive of newsgroup comp.software-eng
tmc-technical-reports.src	Sampling of reports from Thinking Machines Corp
UNTComputerDoc.src	Technical documents written by Academic Computing Services at the University of North Texas

Languages

comp.lang.perl.src	Index of news group comp.lang.perl (perl computer language)
comp.lang.tcl.src	Archive of comp.lang.tcl newsgroup (tcl computer language)
tcl-talk.src	Think Class Library discussion list (Think C/Pascal for Mac)

Computer Software

ASK-SISY-Software-Information.src	Information on software for different fields of interest to universities
comp.binaries.src	Archive for comp.binaries newsgroup (executable code for a variety of operating systems)

comp.db.src	Previous 10 days news in newsgroup comp.databases
comp.emacs.src	Previous 10 days news in newsgroup comp.emacs
comp.sources.src	Previous 10 days news in comp.sources*
comp.windows.ms.src	Archive of comp.windows.ms newsgroup (MS windows, programming, applications etc)
cosmic-abstracts.src	Abstracts of programs in the COSMIC inventory
cosmic-programs.src	Sample database of programs developed for the US Government
fj.sources.src	Index to Japanese software archive on utsun.s.u-tokyo.ac.jp
hyperbole-ml.src	Archive of Hyperbole mailing list (information manager built on Emacs)
info-afs.src	Index of archives of mailing list on the Andrew Fiel System
jargon.src	Collection of slang terms used by various subcultures of computer hackers and network phreakers
MacPsych.src	Archive of discussion on software for psychologists
sorrel-ada-archives.src	Software Reuse Repository Labs Ada Sources
wuarchive.src	The directory listing of the software archive wuarchive.wustl.edu

Connection Machine (CM) information

Applications-Navigator.src	A description of some 300 CM applications from many fields (e.g. fluid flow to AI)
CM-applications.src	Applications that run on Thinking Machines' CM series of computers
CM-fortran-manual.src	Documentation for CM Fortran (*)
CM-images.src	Sample images from calculations done on CM computers
CM-paris-manual.src	PARIS manual for programming the CM (*)
CM-star-lisp-docs.src	TMC *Lisp Reference Manual (*)
CM-tech-summary.src	TMC Technical Summary of the CM System (*)
cm-zenon-inria-fr.src	Administrative information for Connection Machine at National Institute of Research in Computer Science and Control (DVI format)
CMFS-documentation.src	CM File Server Reference Manual (*)

CWIS

bit.listserv.cwis-l.src	Archive of Campus Wide Information Systems (CWIS) listserver

Gopher

alt.gopher.src	Archive of the alt.gopher newsgroup

WAIS

alt.wais.src	Articles from the alt.wais newsgroup
au-directory-of-servers.src	Backup copy of the directory-of-servers at Thinking Machines Corp.
cicnet-directory-of-servers.src	Directory of servers at CICnet
cicnet-wais-servers.src	WAIS servers run at the CICnet networld information
Connection-Machine.src	Databases on Connection Machine WAIS sever e.g. factbook, biology, bible, NIH guide (*)
directory-of-servers.src	Directory of servers at quake.think.com
directory-zenon-inria-fr.src	WAIS sources at National Institute of Research in Computer Science and Control (France)

INFO.src .... Same as directory-of-servers.src
IUBio-INFO.src .... Several biology WAIS sources (#)
SDSU-directory-of-servers.src ... San Diego State University directory of WAIS
                                    servers
unc-directory-of-servers.src ...... University of North Carolina directory of WAIS
                                    servers
wais-discussion-archives.src ..... Electronic discussion forum about WAIS
wais-docs.src .... WAIS software distribution documentation
wais-talk-archives.src .... Informal discussions about WAIS

Education

canada-asia-info.src .... Curriculum Resources Database, developed by the
                                    Asia Pacific Foundation of Canada
catalyst.src .... Articles from publication Catalyst on community
                                    services and continuing education
educom.src .... Documents, summaries, calendars etc from
                                    Educom (association for higher education IT
                                    managers)
ERIC-archive.src .... ERIC (Educational Resources Information Centre)
                                    digests
eric-digest.src .... Short reports on topics of prime current interest in
                                    education
jte.src .... Articles from the Journal of Technology Education
kidsnet.src .... Archive of mailing list for international computer
                                    network for children and their teachers
k-12-software-reviews.src .... Software and Courseware Online Review, contains
                                    reviews of educational software
livestock.src .... Educational material for livestock production and
                                    management

Engineering

ijaema_a.src .... Abstracts of papers from the International Journal
                                    of Analytical and Experimental Modal Analysis
software-eng.src .... Archive of newsgroup comp.software-eng

Environment

DOE_Climate_Data.src .... Index to US Dept of Energy world study reports
                                    covering subjects from air pollution to
                                    environmental policies to geological structure
environment-newsgroups.src ..... Archive of number of environmental newsgroups
Global_Change_Data_Directory.src .. Index of global climatic change study reports
great-lakes-factsheets.src .... Factsheets on environmental issues and subjects
                                    relevant to the US Great Lakes/St Lawrence river
lolita-miljo.src .... Abstracts of environment related literature from
                                    Lund University, Sweden
midwest-weather.src .... Weather forecasts for US midwestern states,
                                    updated hourly
miljodatabas.src .... Index of environmental research projects from
                                    Lund University, Sweden
NOAA_National_Environmental_Referral_Service.src .. US National Oceanic &
                                    Atmospheric Admin environmental tests and
                                    available data (sun, atmosphere, earth and oceans)
USGS_Earth_Science_Data_Directory.src .. US Geological Survey directory of earth
                                    sciencs and natural resource database

Finance
agricultural-market-news.src ..... Agricultural commodity market reports compiled by
                                    the US Department of Agriculture

EIA-Petroleum-Supply-Monthly.src	Tables and figures from US Dept of Energy, Energy Information Agency on disposition of petroleum products (postscript format)
nafta.src	Full text of the North American Free Trade Agreement
usda-rrdb.src	US Dept Agriculture agriculture and economic research
wall-street-journal-sample.src	A couple of months worth of the Wall Street Journal (*)

Graphics

AVS_TXT_FILES.src	
comp.graphics.src	Previous 10 days news in newsgroup comp.graphics
sample-pictures.src	Sample images in PICT format

Humanities

acronyms.src	Large list of acronyms and abbreviations
Aesop-Fables.src	A collection of over 300 fables (RTF format)
ANU-Pacific-Manuscripts.src	Catalogue of microfilm collection of Pacific studies at the Australian National University
ANU-SocSci-Netlore.src	Network resources useful to humanities and social science researchers
ANU-Thai-Yunnan.src	Bibliography and notes of Thai-Yunnan Project at the Australian National University
bryn-mawr-clasical-review.src	Review of books in Latin and Greek classics
bush-speeches.src	Speeches and information from the office of former US president George Bush
clinton-speeches.src	Speeches by Bill Clinton for 1992 US presidential campaign
comp-acad-freedom.src	Computers and Academic Freedom lists (policies, bibliographies etc)
computers-freedom-and-privacy.src	Text of the proccedings of the conference "Computers, Freedom and Privacy II" 1992
humanist.src	Volumes of the Humanist discussion list maintained at Brown University
india-info.src	Miscellaneous information for the Indian community
indian-classical-music.src	Music titles by Indian musicians
israel-info.src	Information on the State of Israel (including New East Report reprints)
jiahr.src	Articles from the Journal of International Academy of Hospitality
MacPsych.src	Archive of discussion on software for psychologists
movie-lists.src	Archive of rec.arts.movies lists of references to TV and film credits
movie-reviews.src	Movie reviews submitted by network newsgroup subscribers
Omni-Cultural-Academic-Resource.src	Collection of international/cultural material including food, music, language, politics, religion, travel etc
poetry.src	Complete poetic works, including the complete poems of Shakespeare, Yeats, and Elizabeth Sawyer
proj-gutenberg.src	Documents produced by Project Gutenberg, an effort dedicated to the creation and distribution of English language electronic texts

roget-thesaurus.src	Roget's Thesaurus, provided by Project Gutenberg
sample-books.src	Sample books and documents indexed at Thinking Machines
Science-Fiction-Series-Guide.src	"Reviews" of the major works of selected science fiction writers, and list of works on alternate history themes
sf-reviews.src	Science Fiction review articles
simpsons.src	Capsules for each episode of The Simpsons
thesaurus.src	As roget-thesaurus.src
toxic-custard-workshop.src	sarcastic/black humour
unced-agenda.src	Agenda for United Nations RIO summit
world-factbook.src	The 1990 World Factbook produced by the CIA with information on countries and cities (*)
world91a.src	1991 CIA World Factbook with information on countries and cities

Journalism

factsheet-five.src	Information on 'zines' (underground, low circulation magazines)
journalism.periodicals.src	The Journalism Periodicals Index
london-free-press-regional-index.src	Index of stories in the London Free Press (London, Canada)
the-tech-v112.src	112th volume of The Tech, MITs oldest and largest newspaper
vpiej-1.src	Mailing list for electronic publishing issues, especially related to scholarly electronic journals

Religion

ANU-Asian-Religions.src	Bibliographic references to (mainly Buddhist) Asian religions
bible.src	King James version of the Bible (*)
Book_of_Mormon.src	The Book of Mormon - Gutenberg version 11
Quran.src	The Koran

Information Sources

aarnet-resource-guide.src	A copy of the AARNet Resource Guide
academic_email_conf.src	Info on newsgroups and electronic conferences (including Kovacs' scholarly e.c. list)
archie.au-ls-lRt.src	An index of the files on the Australian archive site 'archie.au'
archie-orst.edu.src	Index to SURAnet archie database of computer software
cicnet-resource-guide.src	Guide to some internet resources
comp.doc.techreports.src	Availability of tech reports from comp.doc.techreports newsgroup and various FTP sites
elec_journ_newslett.src	Information on electronic journals and newsletters for many disciplines (based on Strangelove's directory)
fidonet-nodelist.src	A list of nodes in the Fidonet network
file-archive-uunet.src	Directory listing of the archive on uunet.uu.net
finding-sources.src	Finding information on the network
ftpable-readmes.src	Database of README files from anonymous FTP sites around the world
ftp-list.src	Jon Granrose's anonymous FTP list
jik-usenet.src	FAQ articles from various newsgroups
lists.src	Several master lists of newsgroups, mailing lists, electronic serials and journals
netinfo.src	Index of text files relating to administration of the

	Internet
network-bibliography.src	Network related bibliographies
news.answers-faqs.src	Frequently Asked Questions on all subjects from news.answers newsgroup
news-conf.src	Conference announcements posted to news.announce.conferences newsgroup
quake.think.com-ftp.src	Directory of README files at the Thinking Machines Corp. ftp server
UNC_BBS_Info.src	University of North Carolina bulletin board services
unc-ch-info.src	Most of University of North Carolina's INFO database (maintained by Judy Hallman)
utsun.s.u-tokyo.ac.jp.src	Directory of major Japanese FTP site utsun.s.u-tokyo.ac.jp
uunet.src	UUNET directory listing of FAqs from all newsgroups
uxc.cso.uiuc.edu.src	Recursive directory listing of uxc.cso.uiuc.edu

Law

columbia-law-library.src	A subset of the Columbia Law School online card catalogue
columbia-spanish-law-catalog	Columbia Law School index to Hispanic legislation
computers-freedom-and-privacy.src ..	Text of the proccedings of the conference "Computers, Freedom and Privacy II" 1992
eff-documents.src	Documents and newsletters from the Electronic Frontier Foundation (education, policy, awareness, law etc applied to computers and communications)
eff-talk.src	Archive of the newsgroup comp.org.eff.talk (Electronic Frontier Foundation)
law-employers.src	Summary of legal employees in the US
patent-sampler.src	About 2 weeks of patent applications at the US Patent Office (*)
rkba.src	Files relating to the US Right to Keep and Bear Arms
supreme-court.src	US Supreme Court decisions in full text
us-judges.src	Records of clerkship application requirements for US Federal and upper level State courts

Libraries and Catalogues

bit.listserv.pacs-1.src	Discussion about computer systems provided by libraries to their patrons
columbia-law-library.src	A subset of the Columbia Law School online card catalogue
comp.internet.librart.src	Index to newsgroup on electronic libraries
current.cites.src	Index of more than 30 journals for articles on electronic publishing, optical disk technologies, computer networking, information transfer and related topics
dit-library.src	Dept of Computer Engineering, Lund University, Sweden, library catalogue
hytelnet.src	Information sources accessible by TELNET including library OPACs (catalogues), bulletin boards, and others
inet-libraries.src	Information on accessing Internet and Janet (UK) accessible libraries
online-libraries-st-george.src	Art St George's directory of libraries and CWIS's available over the network, together with access details

tmc-library.src .... A catalogue of the library at Thinking Machines Corp.

Mathematics

bib-cirm.src .... Books and conferences proceedings in mathematics (French keywords)

bib-dmi-ens-fr.src .... Bibliography of books and conference proceedings on maths and comp sci (French keywords)

netlib-index.src .... Indexes of the netlib mathematical software archive

s-archive.src .... Mailing list archive for discussions about the S statistical analysis software

sas-archive.src .... Mailing list archive for discussions about SAS statistical analysis software

spss-archive.src .... Mailing list archive for discussions about SPSS statistical analysis software

stats-archive.src .... US statistics theory mailing list archive

Miscellaneous

edis.src .... California's Emergency Digital Information System news release test messages

sustainable-agriculture.src .... Information on appropriateness of technology, organic farming, gardening etc

weather.src .... Weather information, including surface analysis weather system maps

zipcodes.src .... USA zipcode database

Multimedia

comp.multi.src .... Index of news group comp.multimedia

comp.text.sgml.src .... Archive of Standard Generalized Markup Language newsgroup

disco-mm-zenon-inria-fr.src .... Multimedia documents in Internet MIME multimedia mail format

mime-samples.src .... Multimedia documents in Internet MIME multimedia mail format

SGML.src .... Standard Generalized Markup Language information

SIGhyper.src .... Documents from the SGML Users' Group SIG on Hypertext and Multimedia

Networks

bcs-calendar.src .... BCS calendar for this month and next month

bit.listserv.cdromlan.src .... Archive of mailing list on cdrom products and LANs

comp.dcom.fax.src .... Archive of comp.dcom.fax newsgroup (fax hardware, software and protocols)

com-priv.src .... Discussions about issues related to the commercialisation and privatisation of the Internet

disi-catalog.src .... Availability and capability of X500 implementations

eff-documents.src .... Documents and newsletters from the Electronic Frontier Foundation (education, policy, awareness, law etc applied to computers and communications)

eff-talk.src .... Archive of the newsgroup comp.org.eff.talk (Electronic Frontier Foundation)

matrix_news.src .... Articles etc. from Matrix News monthly newsletter (Matrix News and Directory Services, Inc.)

mailing-lists.src .... Lists of newsgroups, mailing lists, electronic serials and journals, with access details

merit-nsfnet-linkletter.src .... Articles about the NSFNet and the Internet

network-tools.src	Descriptions and documentation about software tools for network monitoring and management
netbib.src	Bibliography of research on broadband networking, video and sound
phrack.src	All issues of Phrack - an old hacking and phreaking newsletter
ripe-database.src	RIPE (Reseaux IP Europeens) network contacts database
usenet-cookbook.src	The USENET Cookbook
usenet-FAQ.src	Some of the FAQ articles from USENET
x.500.working-group.src	Information about the availability and capability of X.500 implementations

Documentation and Standards

ietf-docs.src	Internet Engineers Task Force working documents
ietf-drafts.src	Internet Engineers Task Force drafts and working documents
internet-documents.src	Database of Internet Engineering Task Force (IETF) documents, including working group charters and minutes
internet-drafts.src	Draft copies of future Internet RFC (Request for Comment) documents
internet-resource guide.src	Guide to using the Internet
internet-rfcs.src	Internet Request for Comment documents
internet-standards.src	Subset of RFC's (Request For Comment documents of internet 'standards')
Internet-user-glossary.src	Glossary of internet technical terms from IETF working group
open_systems_calendar.src	Meetings of OS committee and working groups
rfc-index.src	An index of the list of Internet RFCs
ripe-documents.src	All documents available from ftp.ripe.net (RFC, IETF, IESG, RIPE and more)
ripe-internet-drafts.src	All internet drafts available from ftp.ripe.net
ripe-rfc.src	All RFCs available from ftp.ripe.net

Security

cert-advisories.src	Computer Emergency Response Team advisories on OS patches to correct security problems
cert-clippings.src	CERT clippings on security, holes and patches from various newsgroups
comp.risks.src	Archive of comp.risks newsgroup (risks to public in computers)

Using the Internet

internet_services.src	Documents describing services available on the Internet
internet_info.src	Texts, guides and info on internet use and ettiquette
netinfo-biblio.src	Bibliography of documents on using information services on the Internet
netinfo-docs.src	Various files with information on accessing the Internet and its resources
zen-internet.src	Zen and the Art of the Internet document, a network introduction

Phonebooks, Mail and Computer Lists

bitearn.nodes.src	Database of computers on BITNET center
cissites.src	LIst of contacts for organisations in the former Soviet Union who have/plan email
college-email.src	Email formats for US Uni students (by institution)
congress.src	Names, addresses and 'pnone numbers for each

	US state congressman
domain-contacts.src	Internet network domains and their contacts
domain-organizations.src	Network domain names and organisations
fidonet-nodelist.src	A list of nodes in the Fidonet network
info-nets.src	Archive of infonets mailing list
internet-domain-contacts.src	Internet domains and contact information for the responsible parties
internet-phonebook. src	Index of the NFS Network Service Center Network Managers Phonebook
irtf-rd.src	IRTF Resource Discovery mailing list
monashuni-phonedir.src	Monash University 'phone directory
online@uunet.ca.src	The Online mailing list for information brokers and other people who search on line databases
SDSU_PhoneBook.src	San Diego State University 'phone directory
sfsu-phones.src	San Francisco State University 'phone directory
UNC_Staff_Phone.src	University of North Carolina staff 'phone directory
UNC_Student_phone.src	Directory of students, University of North Carolina, Chapell Hill ,USA
uk-name-registration-service.src .	Database of UK hostnames and addresses
usace-spk-phonebook.src	US Army Corps of Engineers 'phone directory
usenet-addresses.src	A database of e-mail addresses of people who post to USENET
uumap.src	Tracks computers that are UUCP and Usenet sites around the world
whois.src	Whois service for finding information on internet domains, networks, hosts, organisations and people

Recreation

falcon3.src	Articles on flight simulation computer games
homebrew.src	Discussion on the art of brewing your own (beer that is)
movie-lists.src	Archive of rec.arts.movies lists of references to TV and film credits
movie-reviews.src	Movie reviews submitted by network newsgroup subscribers
netrek-ftp.src	Archive of information on Netrek (game)
rec.gardens.src	Index of articles from the rec.gardens recreational gardening newsgroup
rec.pets.src	10 days news from rec.pets newsgroup (dogs, cats, etc)

Music

BGRASS-L.src	Archive of mailing ist on discusion of Blue Grass music
cdbase.src	Database of compact disk titles, record company and item number
early-m.src	Archives of discussions on early (medieval, rennaisance, baroque) music from rec.music.early newsgroup and earlym-l listserver
lyrics.src	The lyrics for a selection of contemporary music
midi.src	Musical Instrument Digital Interface documents
music-surveys.src	Comments on performers and music from rec.music newsgroups
MuTeX.src	Archive on discussion on TeX typesetting music from the Mutex mailing list
rec.music.early.src	As early-m.src

Food
recipes.src .... Recipes

Robotics
comp.robotics.src .... Archive of comp.robotics newsgroup

Research (Miscellaneous)
cerro-l.src .... Mailing list contributions on research in Central Europe from the Central European Regional Research Organisation

eos-ncsu.src .... Online help for N.C. State University's Project Eos

ut-research-expertise.src .... University of Texas Catalogue of Research Expertise

UIO_Publications.src .... Research publications at the University of Oslo

US-Gov-Programs.src .... US Government research programmes

NCGIA-technical-reports.src ..... NCGIA Technical Reports

nsf-awards.src .... Abstracts for awards made by the US National Science Foundation

nsf-pubs.src .... Publications of the US National Science Foundation

unimelb-research.src .... 1990 University of Melbourne (Australia) research report

Science (general)
sci.src .... News from sci.* (science) newsgroups e.g. aeronuatics, electronics, medicine, physics, space

water-quality.src .... Education material on water quality assessment

US Government Departments
ota.src .... US Ofice of Technology Assessment policy documents

US-State-Department-Travel-Advisories.src .. Archive of mailing list of US State Dept world wide consular information sheets and travel warnings

APPENDIX E: SIGWAIS MAILING LIST

The following is the the list of those attending the conference July 23, 1993, and of those wishing to be included on the mailing list only. It is final as of August 19, 1993.

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Internet:/PN=ELIZABETH.L.BROWN/PRMD=R
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BG 12A   RM 3018
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FAX: (301)402-0007
Internet: ec2a@nih.gov

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National Archives Library, Room 200
Washington, DC 20408
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Internet: ID4@cu.nih.gov

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